

COMPUTERWORLD

Strike two: IBM sues Comdisco once again

Were users misled by mislabeled memory cards?

BY NELL MARGOLIS
and ROSEMARY HAMILTON
CW STAFF

ARMONK, N.Y. — For the second time this year, IBM has sued computer leasing and remarketing rival Comdisco, Inc. The charges leveled last week in the latest lawsuit could have a dire impact on all third-party resellers and their customers, one market analyst said.

In a suit filed last Thursday, IBM accused Comdisco of producing counterfeit memory cards for IBM 3090 mainframes and selling or leasing them with fake IBM serial numbers "to unsuspecting customers."

Comdisco admitted that it resold non-IBM manufactured memory cards for a six-month period but said it did not reconfigure memory boards.

IBM also said the cards are of substandard quality, with a potentially dangerous result for users. "Some of the counterfeit cards have already failed in customer installations, and others are likely to fail," the suit said.

IBM filed its lawsuit with four affidavits from Comdisco customers intended to support its claim that the leasing company was misleading users. The customers are the Sabre Group, which provides information systems services to Federated Department Stores, Allied Stores Corp. and R. H. Macy & Co.; American Airlines; Giant Food, Inc.; and Lands' End, Inc.

However, only one of the four customers experienced a system failure because of the Comdisco-supplied memory, according to IBM. An IBM spokesman said

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Tandem bets big on RISC

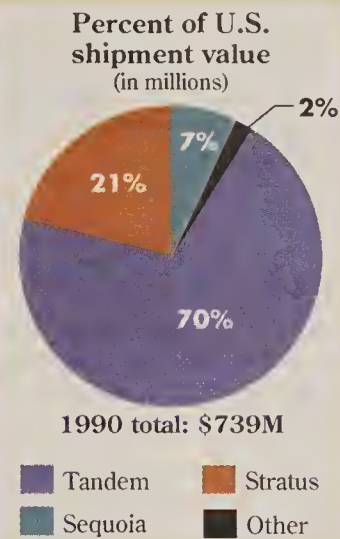
BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. is expected to announce today that it will base all of its future computers on reduced instruction set computing chip technology. The move is a major strategic shift for the fault-tolerant market leader and should roughly double price/performance across its product line, according to Tandem.

A new generation of Tandem computers will be based on 32-bit RISC chips made by Mips Computer Systems, Inc. The systems range from low-end Unix servers to midrange CLX computers and Cyclone mainframes. The first set of RISC-based products will be delivered by year's end. Meanwhile, arch-

Trading shares

Tandem may hold 70% of the fault-tolerant market, but it has lost more than 6% in the past two years



Source: International Data Corp.
CW Chart: Michael Siggins

rival Stratus Computer, Inc. unveiled new RISC-based systems last week (see story page 8).

Tandem promised a transparent migration path to the RISC technology for current users. Current CLX users will be able to upgrade their equipment with a board swap to the RISC chip.

"This is a fundamental shift," said Roy Graham, group manager of Tandem's Systems Product Development.

Applications written for Tandem's transaction processing-oriented Guardian operating system will run without change on the RISC processors, Graham said. In addition, a Guardian utility called the "accelerator" will act as a postcompiler to boost performance on the RISC chip by 10% to 15%, Graham said.

Continued on page 8

Red ink sweeps Compaq founder out the door

BY MICHAEL FITZGERALD
CW STAFF

HOUSTON — Compaq Computer Corp. stunned the industry late last week by abruptly dismissing Joseph R. "Rod" Canion, its co-founder and longtime president and chief executive officer.

Canion was replaced by Eckhard Pfeiffer, executive vice president and chief operating officer.

Compaq gave no reason for the move, which came days after the company disclosed a \$70 million third-quarter loss. The company also announced that it will lay off some 1,400 workers.

Pfeiffer said there had been disagreements be-



Canion bore the brunt of Compaq's market share losses

tween Canion and the board, but those disagreements do not necessarily relate to Compaq's basic strategies. "Sometimes it's a matter of managerial issues or whatever you pick: We are not disclosing specifics," he said.

Observers contend that the board grew tired of Canion's slow response to Compaq's falling market share, excessive loyalty to the dealer

channel and high cost structure.

Whatever the reason, Compaq will suffer in the market as it recovers from the twin blows of losing Canion and implementing a restructuring, analysts said. Still, the shift was welcomed by many.

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IBM vs. Comdisco

At issue: use of non-IBM memory boards

- IBM claims Comdisco produced phony components and passed them off as IBM memory boards.
- IBM says customers have memory board time bombs that could fail because of substandard manufacturing. Some already have, IBM claims. Customers with bogus boards are not covered under the terms of IBM maintenance agreements.
- Comdisco says it did buy reconfigured boards from other sources last year and resold them to customers but was not aware of possible maintenance problems.
- Only one in four customers named by IBM has actually experienced a board failure.

CW Chart: Michael Siggins

Clone makers under Big Blue attack

BY MICHAEL FITZGERALD
CW STAFF

LAS VEGAS — IBM's much-maligned personal computer hardware division is showing signs that it can carry through on earlier promises to hone its com-

petitiveness. However, regaining buyer confidence is another matter.

To regain its edge, IBM has taken steps toward cutting prices, strengthening its product line and improving new products' time to market. Some of

those changes were evident at Comdex/Fall '91, where IBM demonstrated its prototype pen-based system along with other innovations.

Skeptical users, however, said they believe the computer giant will have to commit to long-term aggression if it wants to block clone inroads.

"I haven't seen anything significant that they've done heads above anyone else," said Joe Sanchez, systems planning analyst at Florida Power and Light Co. in Miami.

"We've standardized on Compaq systems here, and that's

where we plan to go forward," said Michael Ball, data processing coordinator at the Federal Reserve Bank in Baltimore. Ball added that the bank has not purchased new IBM desktop hardware in two years, although it continues to use installed IBM hardware.

IBM's revitalization efforts may get an indirect boost from rival Compaq Computer Corp., which last week reported a \$70 million loss, fired co-founder Rod Canion and announced a 12% worldwide layoff (see stories above and page 6).

IBM is banking on PC innovations rather than clone maker failures, such as the company's

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Demystifying mummies via computer leaves their wrappings untouched. Page 20.

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"If it takes until the end of 1992, we're out of the game. We'll have no credibility left."

LEE REISWIG
IBM

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The 5th Wave



OK, SO MAYBE COMDEX WASN'T READY FOR OUR MICROWAVE SLOW-COOKER THIS YEAR, BUT I STILL THINK WE SHOULD GO AHEAD WITH THE TRACKBALL GARAGE DOOR OPENER.

EXECUTIVE BRIEFING

■ **IBM steps up attacks on independent lessors**, suing Comdisco for allegedly counterfeiting IBM memory cards and installing them in customers' computers. Comdisco denies deceiving customers. Analysts say the suit is a broadside against the independent leasing industry as IBM aims to establish its own leasing arm positioned as the only safe choice for customers. **Page 1.**

■ **Automating manufacturing operations** should no longer be seen as an end in itself, experts say. Instead of merely boosting or improving production, manufacturing systems must be seen as a part of a company's strategic plan. In many cases, this shift requires re-engineering various manufacturing processes and better integration with the rest of the enterprise. **Page 67.**

■ **Fault-tolerant computing is in transition.** Tandem is expected to orient all future development toward RISC chips from Mips Computer, claiming twice the price/performance and a smooth migration for current customers. **Page 1.**

■ **Stratus opts for RISC and Unix** while offering its customers the choice of sticking with their existing operating systems. **Page 8.**

■ **The latest OS/2 delay won't hurt** the product's chance for success, IBM says. Corporate users and developers seem to agree, saying that they will wait the additional three months for OS/2. **Page 4.**

■ **Informix joins the features wars**, promising two-phase commit and stored procedures support in a new release due by mid-1992. Oracle and Ingres have already announced plans to offer those options. **Page 6.**

■ **Novell will add imaging support** to its network software. The network leader is teaming up with Kodak to give Netware users the ability to handle images across local-area and enterprise networks. **Page 108.**

■ **While some confusion still exists** about exactly what information resource management signifies in a business context, employment experts say it's a concept IS professionals should explore. **Page 93.**

■ **Two IBM CASE business partners launch AIX products** in a move that IBM says is just the first step toward a broader family of

CASE software for its Unix platform. **Page 16.**

■ **A small Silicon Valley company**, Red Brick Systems, is marketing software that it says can speed up SQL searches by a factor of 10. **Page 29.**

■ **Municipal governments have found a novel way** to save software dollars: They share software, using a computer bulletin board as a clearinghouse. Some say sharing others' internally developed software has saved them hundreds of thousands of dollars. **Page 59.**

■ **Computer companies go offshore** to save software development money and offer products tailored to local needs. Vendors say the benefits are high and the risks modest. **Page 89.**

■ **Some IBM customers are annoyed** at the vendor's insistence that they use separate workstations for Token Ring and Ethernet network management. **Page 51.**

On site this week: The L.A. Dodgers turn to AS/400s and financial management software to track their fixed assets...er, players. **Page 27.** One General Dynamics division takes distributed databases extra seriously, using a mainframe only to point to the location of data scattered throughout the unit. **Page 29.** Dunkin' Donuts doesn't sugarcoat the difficulty of migrating to workstations from PCs, but it's committed to application downsizing. **Page 41.** Open systems and redundant disks help get Kiwi fruit from New Zealand to your supermarket. **Page 49.**

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Windows upgrade may crash less often

BY JAMES DALY
CW STAFF

LAS VEGAS — Microsoft Corp. last week outlined new features of its long-delayed Windows 3.0 upgrade, noting that the package will be less susceptible to the persistent Unrecoverable Application Error (UAE) crashes that have plagued many users.

Shoring up Windows reliability is critical to Microsoft's efforts to convince corporate information systems departments to standardize on Windows. As one such user noted last week at Comdex/Fall '91, "I can't run my company on Windows; it's too unstable."

To assist the debugging process, Microsoft wrote a program called Dr. Watson, a set of diagnostic tools designed to pinpoint the source of the ambiguous UAE messages. Dr. Watson will not be able to prevent UAE messages, but it does provide a comprehensive audit trail.

Although UAEs can occur any time, users said problems are most frequent when Windows 3.0 is pushed to its limits, particularly when they work with networking applications, during enhanced-mode Dynamic Data Exchange (DDE), under low-

memory conditions and while printing.

Steve Ballmer, Microsoft's senior vice president of system software, claimed many of the UAEs were triggered by the way applications interacted with Windows.

Observers said Microsoft is going to great lengths to ensure that the upgrade is as bulletproof as possible when it ships in the first quarter. Windows 3.1 is now at 10,000 beta-test sites, surpassing even the mammoth beta program of DOS 5.0. "We can't afford not to do the upgrade right," said Rich Abel, group product manager.

Insiders said Microsoft's new penchant for extraordinarily large beta-test groups — most beta tests consist of about 100 sites — results from the plethora of software incompatibility complaints emanating from the IBM-produced DOS 4.0. The bugs were later weeded out when Microsoft reworked the code into DOS 4.01, but many users stayed with the earlier DOS 3.1 or 3.3 releases, and the prestige of DOS took a hit.

Among the new features in Windows 3.1 are the following:

- Greater application integration. Microsoft officials said Ver-

sion 3.1 will include DDE, Object Linking and Embedding (OLE) and drag-and-drop, a graphical icon-based component that simplifies application use. DDE and OLE are available only in limited quantities today in programs such as Microsoft's Excel spreadsheet and Lotus Development Corp.'s Amipro word processor.

- Beefed up Microsoft's Open Tools strategy, adding some application programming inter-



Stephen Sherman

Microsoft's Ballmer: UAEs triggered by the way applications interacted with Windows

faces (API) to Version 3.1 that are aimed at developers of debugging tools.

- Support for Microsoft's Windows for Pen Computing package, as well as a feature called Common Dialogue, which contains a set of commonly used dialog boxes that developers can pop in their application.

- Enhanced multimedia features, including added support for audio and device control, be-

ginning with the third beta release. The new audio features in Version 3.1 will allow users access to sound by adding a low-cost audio board. Because the upgrade will include all Windows multimedia-oriented APIs, including the media control interface, users can incorporate animation and video by adding third-party devices and drivers.

- Truetype, which has been developed jointly by Microsoft and Apple Computer, Inc., will be incorporated directly into the Windows Graphics Device Interface. Truetype will allow users to scale, rotate and otherwise manipulate fonts.

Windows 3.0 users have long complained that its bit-mapped fonts cannot be scaled, while outline fonts can be scaled to any size based on a mathematical description. Bit-mapped fonts are often slow to display on-screen, print inconsistently and demand big chunks of hard disk space because each bit-mapped font must be stored separately on disk.

Version 3.1 will also address complaints about Version 3.0's file manager, which must revert to DOS commands to perform a number of functions. The upgrade promises a new file manager that lets the user split the screen vertically to show a directory tree on the left and files in the selected directory on the right. The program manager will also let the user specify a set of "start-up" applications that will automatically be available in icon form when the system is started.

IBM insists OS/2 2.0 worth the wait

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — "Don't worry, be patient." That's the message IBM delivered to the OS/2 faithful here at Comdex/Fall '91, and it appears that even the skeptical will do just that.

IBM was resolute in its refusal last week to dwell on its decision to delay volume delivery of OS/2 2.0 until March.

Shrugging off its critics, company executives stuck to their vision of OS/2 as "the center of it all" and talked about winning over the mass market with aggressive pricing and vastly broadened distribution.

IBM explained to a gathering of users, analysts and the press that its decision to delay OS/2 2.0 came as a result of customer requests for added functionality and would result in a more robust offering.

While certainly not pleased about the delay, some IBM development partners and long-time OS/2 users resignedly readjusted their calendars and appeared to take in stride IBM's formal announcement that the final version of the 32-bit system software will not ship as prom-

ised by year's end.

Joanne T. Witt, a manager at the Office Systems Computer Technology Group of Siemens Medical Systems, Inc. in Iselin, N.J., is a three-year OS/2 veteran and somewhat cynical, at that. She said she is not happy, but she will wait. For Witt, Microsoft Corp.'s Windows environment is just not a viable option.

Meta Group, Inc., which sells market research to end users, maintains that information systems directors and IS vice presidents in the Fortune 500 like what they see in OS/2 and do not like what they are hearing from Microsoft in terms of an enterprisewide strategy.

Where IBM will fail with OS/2 is in winning over the bottom-up decisions, analyst Frank Michnoff said.

"People are making too much of this" delay, Micrografx, Inc. Chairman Paul Grayson said. Along with consultant Amy Wohl at Wohl Associates, he said he thinks it is a mistake for people to get hung up on the date.

One observer dryly noted that Microsoft announced Windows 3.1 as an incremental upgrade shortly after the May 1990 release of 3.0 and, at the earliest, will not be releasing it until almost two years later.

"Will I wait another three months? Sure," said one OS/2 beta-test user who asked not to be named. "Any longer than that? Possibly not."

"If 2.0 [takes] six to nine months to ship, that will be a big problem," agreed Lee Reisswig, assistant general manager of programming at IBM Personal

Here's the holdup:

IBM said it will include the following features and functions as requested by OS/2 beta testers:

- Windows running side by side with DOS and OS/2 applications on the same desktop, with the ability to cut and paste between applications.
- 32-bit Presentation Manager technology enabling 32-bit applications to run faster than their 16-bit counterparts.
- New LAN support, making it easier to manage a network.

Systems. "If it takes until the end of 1992, we're out of the game. We'll have no credibility left," he said.

What Reisswig said he does not buy are the critics who say OS/2 has already lost the mass, bottom-up desktop decisions to Windows.

Despite the reservations of Michnoff and others, IBM is so sure it can attract the average computer user that it unwrapped aggressive packaging, distribution and pricing options.

Priced at \$195, OS/2 2.0 will be available as a single, shrink-wrapped package that will run on IBM and selected IBM compatibles with IBM service and support.

New services include free 60-day support via an 800 number and technical information and message exchange through bulletin-board service and IBM Link electronic support.

Users can copy licenses for \$149 without media and documentation. A DOS-to-OS/2 upgrade will be available for \$149, with the right to copy licenses available for \$99. IBM DOS users can upgrade to OS/2 1.3 for \$99 until Dec. 31, 1991.

IBM will also be broadening its distribution channels — for example, retailing through Egg-head Discount Software.

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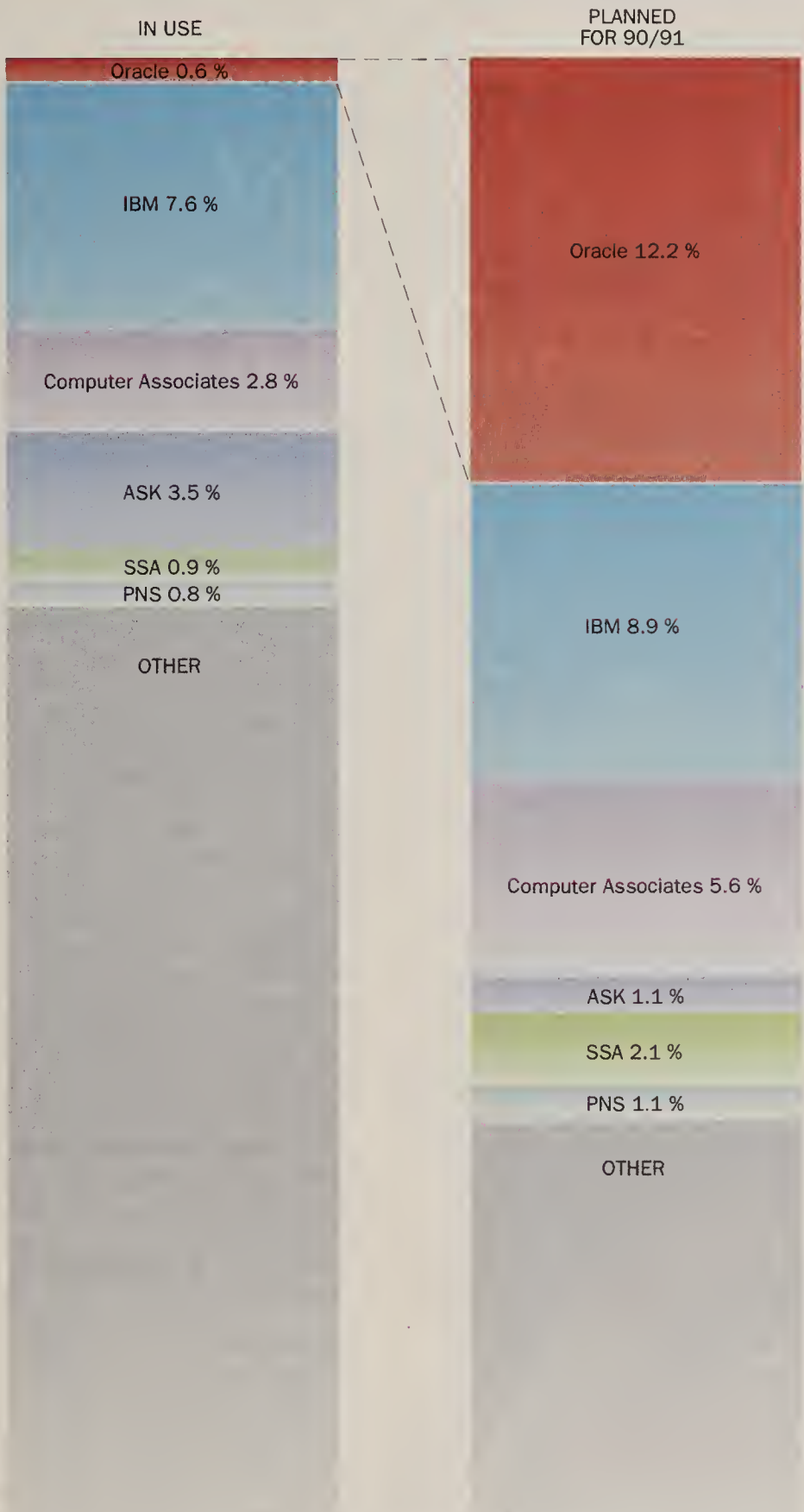
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Compaq posts Q3 loss; lays off 1,400

BY NELL MARGOLIS
and CAROL HILDEBRAND
CW STAFF

HOUSTON — The cost of a corporate restructuring — including a 12% worldwide layoff — last week swept Compaq Computer Corp. into the red for the first time in eight years.

However, analysts said they see the loss as a down payment on a sorely needed new business blueprint for the flagging former highflier. Many seemed willing to suspend judgment on the loss until they can gauge the gains that may result from Compaq's repositioning.

"Compaq had a very inflated cost structure," noted Frederick Cohen, an analyst at Labe, Simpson & Co. "Basically, they've now taken care of that." The bad news, he said, "is that they're about a year behind Apple and others in facing up to having to do it. The good news is, they've done it."

Compaq reported a \$70 million net loss on revenue of \$709 million — down 18% from the year-earlier period — for the quarter ended Sept. 30.

In an interview before he was removed by the board of directors last week, Chief Executive Officer Joseph R. "Rod" Canion

pointed to the worldwide economic slump and personal computer sector slowdown as underlying his company's sagging bottom line.

During the next several weeks, Canion said, an estimated 1,416 jobs will be cut, "across all departmental and geographical boundaries."

Canion said both the slimming and the restructuring (see chart) are aimed at remolding Compaq — traditionally viewed as a technology-driven, premium-price player — into an agile, tightly focused, customer-driven company.

Exactly how Compaq will go about gauging customer needs has yet to gel into a strategy. Meanwhile, the company has assigned a top-level manager, Senior Vice President Murray Francois, to focus full time on the customer satisfaction issue, the company said.

Users had mixed reactions to the restructuring.

It's been awhile

Compaq Computer Corp.
reports its first quarterly loss
since 1983

	Revenue (in millions)	Profit (in millions)
3Q '91	\$709	(\$70)
2Q '91	\$718	\$20
1Q '91	\$971	\$114
4Q '90	\$1,001	\$135
3Q '90	\$863	\$124

CW Chart: Janell Genovese

\$135 million blueprint

Compaq's restructuring plan is aimed at creating a more focused organization

A 12% worldwide work-force cut will lower employee count to 10,384.

Two new divisions created: one will handle PCs; the other is responsible for larger systems.

Former Marketing Vice President Doug Johns will head the new PC division; former Systems Engineering Senior Vice President Gary Stimac will oversee the larger systems unit.

Single sales force will sell products from both groups but otherwise will act autonomously.

Old Compaq equipment, Nelis said, "was built like a tank. What I've seen from Compaq in the last year isn't worth paying extra dollars."

In the long run, however, most seemed to have faith that Compaq would regain lost momentum.

"I can envision them pulling back to the forefront," Nelis said.

Informix still in relational DBMS race with Version 5.0

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — Informix Software, Inc. mapped out a new set of features for its relational database management system last week that it hopes will keep it in the race with market leaders Oracle Corp. and Sybase, Inc.

Informix 5.0 is critical to the future success of Informix, which sells Unix databases through 2,000 value-added resellers worldwide but which has relatively few high-end information systems accounts.

The release is key to Informix's turnaround bid. The company reported quarterly earnings of \$5.1 million last week, compared with a \$4.2 million loss in the same period a year earlier. Revenue for the period ended Sept. 30 was \$48.3 million, up 23% from the corresponding period last year.

Leapfrog release

The Informix 5.0 engine will, for the first time, support two-phase commit, which enforces proper updates, and stored procedures, which enforce consistent data values. Both features are key because Ask Computer Systems, Inc.'s Ingres and Sybase support them now, and Oracle is set to deliver them with Oracle Version 7.0 in 1992.

"I think Informix 5.0 is a leapfrog release," said Kurt Wagner, president of Asix, Inc., a Seattle systems integrator. "It strengthens their back-end

[server] technology and puts the company in the Unix server marketplace for on-line transaction processing."

Highlights of the Informix 5.0 release include the following:

- Support for stored procedures, which will speed processing time by checking data integrity in the server, rather than through the application.
- Optimizer override, which gives database administrators the ability to short-circuit programmed SQL queries that have caused poor response times.
- Online Optical, which supports archiving of database images on write-once read-many optical disc drives. Informix already supports the storage of images as binary large objects.
- TP Online/XA, which improves response times for sites that have hundreds of end users accessing a single database. It was designed to work with AT&T's Tuxedo transaction processing monitor, Informix said. "XA is the mechanism by which you talk to Tuxedo," said Donald Feinberg, senior software analyst at Gartner Group, Inc.

Informix 5.0 is slated for a December introduction and for general shipment by the second quarter of 1992, Informix sources said.

In early 1992, Informix is expected to follow up with a new-and-improved Informix fourth-generation language that has support for graphical user interfaces.

IBM drops application marketing rights

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — IBM took the first step toward dismantling its Desktop Software (IDS) group with the announcement last week that Claris Corp. has purchased the worldwide marketing rights to the Hollywood presentation graphics package.

In addition, IBM said it has shifted marketing and development responsibilities for two other packages to other IBM divisions. Storyboard Live has been moved over to the IBM Multimedia Solutions group, while Current, a personal information manager, will be transferred to the IBM unit that handles office products.

David J. Cassano, IDS director of product management, said news about the fate of the independent business unit's four other packages will be released as decisions are made. That may not be by year's end.

Meanwhile, he hastened to assure users of IDS products that IBM will work to ensure a smooth transition as new IBM units or business partners take control of the various packages. None of the IDS products were market leaders, and some have barely had time to start collecting users. Displaywrite is the major exception, and Cassano said IBM intends to protect Displaywrite investments. He indicated the company is very close to a decision on who will support Signature, a next-generation word processor developed primarily by Xyquest Corp.

Claris, an Apple Computer,

Inc. subsidiary, plans to come out with a Macintosh-compatible version of Hollywood "as soon as possible," noted Claris President Dan Eilers. He also acknowledged that Hollywood's developer, Publishing Solutions, Inc., is already at work on an OS/2 version. No delivery dates have been set.

Apt alliances

Several weeks ago, IBM released a statement that said it had "decided to move from a model where IDS is the primary developer and marketer for stand-alone PC applications... to a model based on alliances with major software vendors."

Allying with major software developers aligns IBM with market-leading applications and developers who will not need as

much, if any, financial assistance, Cassano said. "They'll lead, and we'll assist."

But, as Cassano noted, tension can arise in such relationships if the system software provider is also an applications provider.

"We wanted to eliminate that tension; it was a concern," he said, pointing to the effect Microsoft Corp.'s dual role as a system software and applications provider has had on its relationships with third-party developers.

Cassano also reversed previous statements regarding the importance of microcomputer software visibility for IBM. In a June interview [CW, June 24], he said that it was "very important for IBM to participate" in the desktop software market.

Grown LAN Server welcomed

BY JIM NASH
CW STAFF

For those few, brave network managers who have signed on to IBM's OS/2 LAN Server, the new version is a welcome sign of software maturity.

LAN Server 2.0, scheduled to ship April 24, 1992, will connect DOS, 16- and 32-bit OS/2 and Microsoft Corp.'s Windows workstations. Those workstations, according to IBM, will be able to connect to OS/2 and Netware servers on Token Ring and Ethernet networks.

IBM has broken up the new version of LAN Server, a derivative of Microsoft's LAN Manag-

er into two entry-level and advanced versions. Entry largely follows the lines of LAN Server 1.3 with at least one significant exception: It supports OS/2's 32-bit architecture.

Advanced LAN Server brings with it IBM's High Performance File System, supports 16- and 32-bit applications, sports fault tolerance through disk mirroring and duplexing.

Advanced LAN Server requires OS/2 Version 1.3 Standard Edition as a base on the server and will cost \$2,295 with a \$75 per client fee. Entry will cost \$795 with the same client fee and can run on OS/2 1.3 or 2.0 as a base.

IBM sues Comdisco over memory cards

CONTINUED FROM PAGE 1

IBM will not discuss what led it to inspect components of these customers' systems. Whatever motivated IBM to do so will be "revealed as part of the lawsuit," the spokesman said.

However, at Lands' End, based in Dodgeville, Wis., a portion of "what we thought was IBM memory that we leased from Comdisco" failed last year, Gary Steuck, vice president of quality assurance at Land's End, said in a sworn affidavit filed with the IBM complaint. "IBM has now told us that the memory card that failed was not manufactured by IBM."

"More than 100 bogus, phony memory cards have been detected [by IBM] over the past several months," IBM spokesman Ed Trapasso said. Not all, he said, have been traced to Comdisco; IBM is "currently investigating the possibility that other third-party companies are doing this."

Comdisco denied the charges that it manufactured memory boards and passed them off as original IBM memory.

Robert Bardagy, marketing vice president at Comdisco, said that in the summer of 1990, the company became aware that reconfigured IBM memory boards were available on the third-party market. For a six-month period, Comdisco knowingly sold and leased reconfigured boards to a handful of customers, Bardagy said.

In January 1991, Comdisco said, it contacted IBM in writing to seek approval to reconfigure memory boards itself. IBM did not respond directly to this inquiry but indicated verbally that it would not maintain reconfigured boards, according to

Comdisco. Less than a week later, IBM filed its first lawsuit against Comdisco for reconfiguring mainframes.

One longtime Comdisco customer said he had not heard of this latest lawsuit and was surprised by the counterfeiting charge. "We haven't experienced any problems," said Michael Szejnberg, vice president of technical services at Manufacturers Hanover Trust Co.

Last winter, IBM and its leasing subsidiary, IBM Credit Corp. (ICC), charged that Comdisco's reconfiguration of leased IBM computers amounted to wrongful appropriation of IBM property. That action

is now docketed for hearing by a Delaware state court in early February.

ICC President Harry Kavetas has steadfastly maintained that his firm and its parent are simply guarding their property rights.

However, Comdisco and the Computer Dealers and Lessors Association, the association that represents the majority of the third-party industry, have been equally staunch in representing the IBM/ICC suit as an attempt to shut down the third-party industry.

The new suit, "is more of the same: an attempt to terrorize customers out of dealing with the third-party market," Bardagy said.

IBM denied any relation between the suits. The broadsides against Comdisco,

widely viewed as IBM's nearest competitor in the leasing and remarketing arena dominated by ICC, are "two separate, distinct, unrelated actions," Trapasso said.

Regardless of which side eventually wins, analysts said last week, the third-party leasing and remarketing industry and the users who rely on it will lose.

At a minimum, users who buy or lease used equipment through channels other than IBM or ICC are in for a season of confusion, doubt and fear, said Thomas Donovan, an analyst at Framingham, Mass.-based Technology Investment Strategies Corp.

"This is the kind of thing that could rage through the third-party market and the user community like a computer virus," Donovan said.

Sequent slices 20% of work force

BY JEAN S. BOZMAN
CW STAFF

BEAVERTON, Ore. — After posting its third quarterly loss this year, Sequent Computer Systems, Inc. plans to cut its work force by 320 (20%) as of Nov. 1.

The layoffs come amid a restructuring of the \$248 million company, forcing a onetime \$14.6 million charge. Sequent lost \$8.3 million on \$53.8 million in revenue, but it plans to reduce expenses by \$6 million next quarter.

The once high-flying Sequent has suffered two major setbacks: the loss of an OEM contract with Unisys Corp. and slow sales of its Symmetry 2000 Unix computers. "We could have decided to grow our way out of this problem, but that would have meant several more unprofitable quarters," Sequent President Scott Gibson said.

"We felt that would create a credibility problem," he added. "If you're not making money, people don't want to look at your balance sheet." Still, revenue grew 7% compared with the second quarter.

Industry analysts said Sequent was hit by price competition from IBM and Digital Equipment Corp. in the Unix server market. In addition, Sequent rival Pyramid Technology Corp. in Mountain View, Calif., has benefited from joint marketing with AT&T, which resells Pyramid's Unix computers.

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Stratus adds to RISC family

BY MARYFRAN JOHNSON
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc. rolled out the second member of its next generation of fault-tolerant computers last week and outlined plans for migrating its installed base to a reduced instruction set computing (RISC) platform within two years.

The XA/R Model 300 is the first high-end system in Stratus' RISC line that offers customers the choice of sticking with the company's proprietary VOS operating system or moving to its FTX Unix-based operating system.

The VOS-based XA2000 line and the new RISC line are source-code-compatible, so moving applications requires a

recompile, not a code rewrite.

"Stratus is showing that it really does have a commitment to RISC and Unix, but it won't leave the people [who are] already part of the installed base out in the cold either," said Kate Fessenden, an analyst at Meta Group, Inc. in Westport, Conn.

"That dual operating system strategy is important to their long-term success," added Carolyn Griffin, an analyst at International Data Corp. in Framingham, Mass.

The high-end Model 300 joins a midrange processor, the XA/R Model 20, which Stratus introduced last March and began shipping this quarter.

"Customers are very interested in seeing Stratus get on the RISC price/performance curve," Griffin said.

That is certainly true for Envoy Corp. in Nashville, which recently installed a midrange XA/R Model 20.

"I'm expecting Stratus to get much more cost-competitive," said Arthur Fogel, director of technology at the credit card authorization company. "The RISC-based world is an entirely different cost/performance curve, and they have to realize that."

Envoy has nine Stratus XA2000 systems processing more than 750,000 transactions a day from all the major bank card companies. The XA/R 20 is being used for overflow transaction processing and is already handling up to 100,000 transactions daily, Fogel said. "Frankly, I sleep pretty good at night knowing those systems are running, but I have to look at all the [financial] aspects as well," he added.

Yet Stratus is maintaining a healthy financial position in a generally faltering computer industry. The \$400 million vendor released third-quarter earnings last week that showed a respectable growth rate, with earnings up 43% to \$13.9 million and revenue up 8% to \$112.5 million.

Prices on the XA/R Model 300s start at \$343,000 for the Unix model and \$388,000 for the VOS-based system. Available now, the Model 300s deliver two to three times the system performance of a Stratus XA2000 Model 210 and offer more than double the disk capacity and communications lines of the XA/R Model 20s.

Rolling out the RISC

Stratus adds midrange and high-end models to its XA/R Series continuous processing systems

	Model 20	Model 300
Duplex processors	1	1
Processor	Intel i860	Intel i860
Duplexed main memory	32M to 256M bytes	32M to 256M bytes
Duplexed disk storage	.3G to 7G bytes	.3G to 18.7G bytes
Maximum communications lines	600	1,500
Multimodule upgrade for more processing power	Yes	Yes
Operating systems	VOS 11, FTX 2.0	VOS 11, FTX 2.0
List price	\$247,000 (FTX) \$275,000 (VOS)	\$343,000 (FTX) \$388,000 (VOS)

Source: Stratus Computer, Inc.

CW Chart: Michael Siggins

Tandem bets big on RISC

FROM PAGE 1

Tandem will continue to sell complex instruction set computing (CISC)-based Cyclone mainframes and CISC-based Tandem VLX systems for the foreseeable future, Tandem executives said. However, there will be no new design work using CISC, and all future upgrades will be powered by RISC chips.

Nonstop Cyclone/R systems and Integrity systems are available now. Nonstop CLX/R systems will be available in limited quantities in late 1991; general availability will come in 1992.

"We have had some indications about what they're going to do, and we're very intrigued by it," said Phillip Seeley, vice president of MIS at Consolidated Freightways, Inc., whose data center in Portland, Ore., houses eight Tandem VLX machines. "Right now, the current Tandem price/performance caused them to miss some opportunities that are available within our company for CLX machines."

Consolidated Freightways already has 48 CLXs.

This commitment to RISC is part of a strategy to follow industry standards and to take advantage of the semiconductor industry's relentless push toward higher hardware performance.

Yet Tandem, which reported a falloff in fourth-quarter earnings, from \$31.8 million last year to just \$2.8 million this year, is attempting to save internal resources wherever possible.

The move to RISC is also intended to surprise Tandem's rivals in the on-line transaction processor market, including Digital Equipment Corp., Sequoia Systems, Inc. and Stratus. Each company has been stealing market share from Tandem, industry analysts said.

"I think Tandem is saying that price/performance has to increase faster than the 15% to 20% rates of a few years ago," said Roy Schulte, a software analyst at Gartner Group, Inc. in

Stamford, Conn. "They are saying that their value-added has always been the Guardian operating system and their message-passing architecture, rather than the hardware itself."

The danger inherent in Tandem's move to RISC, however, is that Tandem will lose some control of its technology by leaving the RISC design to Mips.

Other highlights of the Tandem announcement include a downsized version of the Cyclone, called the Cyclone/R, which will reduce the entry-level price for a Cyclone system from \$1 million to \$535,000. Another Guardian system, the midrange CLX, has also been downsized. The CLX/R will be priced from \$25,000.

At the same time, Tandem is expected to announce two new Unix computers: the Integrity 100E entry-level system and the Integrity 300 high-end Unix server based on the 25-MHz MIPS R3000 processor. All three Unix machines — which range in price from \$95,000 to \$160,000 — will run USL's Unix System V Release 3.2.

NEWS SHORTS

Lotus to sell in South Africa

In the wake of the lifting of federal economic sanctions against South Africa, Lotus Development Corp. last week announced its re-entry into the South African computer market. It may open a subsidiary "eventually," it said; in the meantime, its wares will be available immediately through two local distributors: Computer Horizons and HNR, the country's sole black-owned software distributorship, according to Lotus.

Wang posts another loss

Reflecting a precipitous decline in shipments, Wang Laboratories, Inc. last week posted a \$9.8 million first-quarter loss. Wang's loss compares with a net profit of \$2.5 million, or \$.02 per share, one year earlier, which included a pretax gain of \$11.8 million from the sale of real estate.

IBM slaps Seagate with suit

IBM has filed suit against Seagate Technology, Inc. and Peter Bonyhard, a former IBM employee who now works as a manager at Seagate's magnetoresistive head development effort. In the suit, IBM claims that Bonyhard, who worked on a similar program at IBM for several years, signed a nondisclosure agreement that prevents him from legally transferring IBM trade secrets to his new employer. The suit, filed Oct. 11 in U.S. District Court in Minneapolis, seeks temporary and permanent injunctions as well as monetary damages against Bonyhard and Seagate.

NTIA grades state of U.S. telecom

The National Telecommunications and Information Administration (NTIA) last week reported that, by some measures, the U.S. public network is among the best in the world but trails some countries in the deployment of digital switches, Integrated Services Digital Network and Signaling System 7. NTIA's infrastructure report also urged more attention to network reliability, more competition at the local-exchange level and removal of the court order that prevents the "Baby Bells" from manufacturing new products.

Sunsoft to ship some Solaris pieces

In an announcement set for Wednesday, some office and developer software components of the as-yet-unreleased Sunsoft, Inc.'s Solaris 2.0 operating system will be released. The complete Solaris 2.0 is not slated to ship until mid-1992, but Desktop Version 3.0, a conglomeration of 15 office productivity tools, including network calendaring and multimedia mail, will be available for a \$30 upgrade. Other increments include developer sets for Open Windows and Tooltalk.

E-mail steps off the wire

AT&T and Skytel Corp. are offering what they claim is the first wireless electronic mail service. Users of AT&T's Easylink E-mail will be able to send a message to someone on the road via Skytel's satellite-based paging service through Skytel Link, a pocket-size message receiver and adapter. Skytel Link can be attached to AT&T's Safari notebook computers. While total message length is limited to 240 characters, an Easylink mail user can send 20 such messages concurrently.

Pyramid eyes databases

Estimating that 90% of its customers use its mainframe-size Unix-based computers to run relational databases, Pyramid Technology Corp. last week established a database division. Pyramid also announced three database management products and promised more to come. The new division will pay select database vendors to port their products to Pyramid's Unix.

Apple notebooks get cellular link

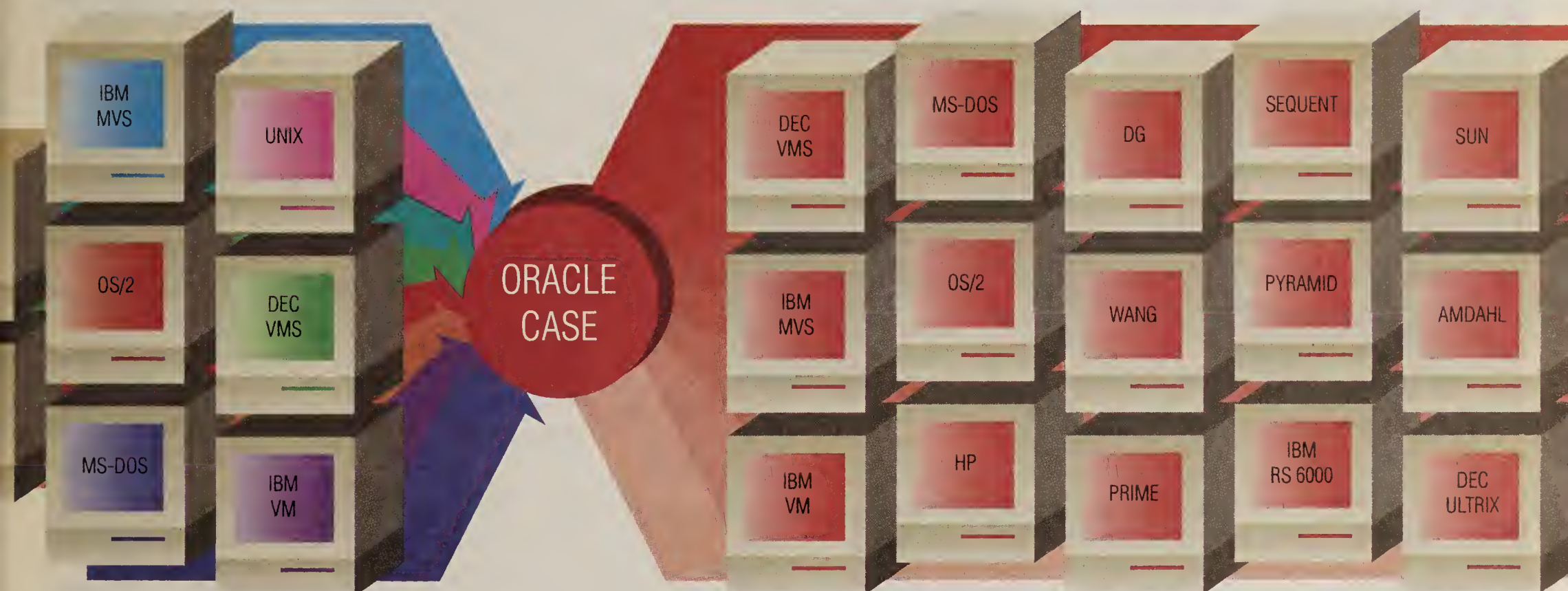
Spectrum Cellular Corp. said last week that it will develop a series of its cellular interfaces for Apple Computer, Inc.'s recently announced Powerbook notebook computers.

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Unisys groups eye merger; firm posts \$75M Q3 loss

BY ELLIS BOOKER
CW STAFF

DENVER — While Unisys Corp. pares down by selling "nonstrategic assets," integrating its disparate product lines and focusing on a small number of key markets, its two domestic user

groups are debating a plan to expand by joining forces.

The topic of merging the two organizations was broached at the first combined Cube and Use, Inc. conference here last week.

Cube and Use existed prior to 1986, when the merger of Bur-

roughs Corp. and Sperry Corp. created Blue Bell, Pa.-based Unisys. Cube, the larger of the two user groups, represents the former Burroughs side of Unisys and is generally characterized by smaller sites. By comparison, Use — a 36-year-old organization — represents a smaller

number of larger Sperry shops.

The two customer bases represent about \$15 billion each in installed hardware and software, according to James T. Ault III, vice president of consulting services at Solutions Development Associates, Inc. in Omaha and a past Use president.

Most users seemed comfortable with the proposed merger, a straw poll of Cube and Use members reported.

"Look, we share a lot of things in common, like the 4GLs and Unix . . . and it would put us in sync with the [Unisys] groups in Europe and Japan," said Herman Schuler, director of systems development at Group W, a Westinghouse Broadcasting Co. unit in Milford, Conn. Both the Japanese and European user groups did away with the Sperry/Burroughs dichotomy a few years ago.

A vote on a merger proposal could come as early as the next joint Use/Cube conference this spring in San Francisco.

Unisys executives expressed no official opinion about the merger plan.

Indeed, Unisys senior management at the conference had other challenges — notably that of assuring their assembled U.S. customers yet again that Unisys' troubled financial picture is looking better.

Revenue down

As expected, the company last week posted a third-quarter net loss of \$75.8 million, but it also reported a slight \$26 million gain in income from operations. Operating profit compared favorably with a \$56 million loss before special charges in the period a year ago. However, revenue was down in the latest quarter, from \$2.40 billion to \$1.97 billion.

"Our debt is down \$1 billion over the past 21 months," Unisys President and Chief Operating Officer Reto Braun told the attendees in a keynote address.

However, some users were not easily assuaged.

"Unisys has tried for five years to combine these two companies, and all it has led to is a mountain of debt," said frustrated Use member Richard D. Vogel, data processing manager of systems at Luskco, Inc. in New Orleans.

Reducing debt is only one pillar of the company's turnaround strategy, Braun said. The company president quickly acknowledged in his keynote that this goal cannot be reached by selling assets alone.

One possible area of growth could be in consulting services. Last week, Unisys announced the formation of the Enterprise Information Technology Planning service, a consulting unit to help customers match their business needs to the Unisys architecture unveiled in October 1990.

Braun said Unisys would focus on the four market segments that represent 70% of its revenue: banking, communications, airlines and government.

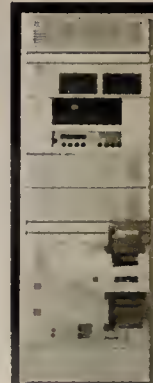
"We want to be No. 1 or No. 2 in our chosen markets rather than have 3% market share in some segments," he said.



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FCC gives Tariff 12 thumbs-up

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission reaffirmed the legality of AT&T's Tariff 12 packages of business network services last week.

The Tariff 12 decision produced a collective "sigh of relief" for more than 130 large business customers who have Tariff 12 custom network deals, according to Patrick Whittle, a Washington, D.C., attorney representing many Tariff 12 users. Any decision to kill Tariff 12 would be "disastrous" for users, he said.

MCI Communications Corp. and U.S.

Sprint Communications Co. said they were disappointed with the FCC ruling and will continue to challenge the legality of Tariff 12 in court. MCI noted that it is a Tariff 12 customer (for certain international circuits), and the only difference between the Tariff 12 deal and AT&T's regular service is a steep discount.

Berge Ayvazian, an analyst at The Yankee Group in Boston, said MCI and Sprint should stop trying to compete in the courts and offer more innovative multiservice discount plans and network management services to compete with AT&T in the marketplace.

The FCC was acting on orders from a

federal appeals court to provide a better explanation of its position that Tariff 12 is legal. AT&T tariffs must be nondiscriminatory, meaning the long-distance carrier must charge all customers the same price for services that are functionally equivalent.

The FCC again rejected the argument made by AT&T's rivals that Tariff 12 deals are merely combinations of individually tariffed services provided at a discriminatory price discount. The FCC said the packages are not equivalent to the individual services because AT&T also provides network management and turnkey service. The result is a "customer perception" that Tariff 12 deals are greater than the sum of their parts, according to FCC officials.

Ma Bell holds on

The largest publicly announced customers of AT&T's Tariff 12 network service

Five-year contract value
(in millions)

General Electric	\$300
Prudential Insurance	\$200
JC Penney	\$160
Metropolitan Life Insurance	\$132
Xerox	\$121
US Air	\$120

Source: AT&T

CW Chart: Michael Siggins

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MAN provider extends its reach

BY ELLIS BOOKER
CW STAFF

OAKBROOK TERRACE, Ill. — Consolidating its position as the largest provider of alternative high-speed local-access networks, Metropolitan Fiber Systems Co. (MFS) acquired a controlling interest in Washington, D.C.-based Institutional Communications Co. last week.

The addition of Institutional Communication's 200-mile fiber network gives MFS a total of 500 route miles of fiber optics for use in metropolitan-area networks (MAN) in 12 U.S. cities.

The acquisition also gives MFS an entree into government accounts. Institutional Communications serves some 18 federal departments and agencies.

"We intend to build upon [Institutional Communication's] reputation for customer service and bring new products and services to the Washington area as well," said MFS President and Chief Executive Officer Royce J. Holland.

One of these services will be a 100M bit/sec. option. This summer, MFS introduced such a network in Houston. Based on the 100M bit/sec. Fiber Distributed Data Interface protocol, the Houston MAN can support a variety of local-area network protocols and is aimed at LAN-to-LAN interconnection applications.

MFS's city-by-city deployment makes sense, analysts said, and should enable the company to stay ahead of the local Bell operating companies, which likewise have plans for high-speed city networks.

"They'll probably be able to ride the crest of the wave toward broadband [network] deployment for the rest of the decade," said Tom L. Nolle, president of CIMI Corp. in Voorhees, N.J.

Nolle noted that the Bell companies, which must contend with larger network infrastructures and regulation, cannot move as quickly as alternative access carriers like MFS. Nolle also observed that MFS will increasingly need to provide inter-city circuits to satisfy customers with operations in multiple MFS cities.

However, MFS has apparently anticipated this requirement. The firm is currently co-developing with some long-distance carriers services to transport 10M bit/sec. Ethernet or 16M bit/sec. Token Ring traffic between cities over fractional DS3 circuits, according to Scott Yeager, who is both MFS's city director for Houston and its LAN product director.



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IS puts new spin on service

Whirlpool uses imaging, WANs for customer assistance

BY ELLIS BOOKER
CW STAFF

KNOXVILLE, Tenn. — Home appliance giant Whirlpool Corp. inaugurated two sophisticated customer assistance centers last week that blend electronic document imaging, advanced wide-area networking and expert systems.

The multimillion-dollar facilities, located here and in Benton Harbor, Mich., will more efficiently handle the 1.6 million calls Whirlpool expects to receive this

year, according to company officials.

"We're constantly looking for technologies that improve service," said Gary Lockwood, director of consumer assistance at Whirlpool's North American Appliance Group.

Using IBM as the prime systems integrator for the project, Whirlpool invested in excess of \$20 million to create the two centers and to deploy the various technologies, Lockwood added.

Indeed, 80-year-old Whirlpool has a history of investing in customer service

technology. In 1967, for example, its "Cool Line" was one of the nation's first toll-free customer assistance lines.

The imaging system, from Online Computer Systems, Inc. in Germantown, Md., gives the company's 100 customer representatives in Knoxville access to 20 years of service and product manuals.

This information — representing more than 150,000 pages — is accessed from IBM Personal System/2 workstations, running IBM's OS/2 and Presentation Manager, that are linked to 10 compact disc/read-only memory drives as well as

Whirlpool's 3090 mainframes.

Agents who in the past had to consult printed manuals or microfiche from a nearby library can now call up text or detailed product schematics from their workstations, typically in under two seconds.

Lockwood acknowledged, however, that the conversion from paper to digital was a formidable task. "It's a major job," he said. "You really have to be committed."

A variety of AT&T hardware, software and long-distance services route incoming phone calls, balancing the work load between the two customer service centers. The calls arrive over AT&T's Megacom 800 Service with Info-2, AT&T's Integrated Services Digital Network product that forwards the calling party's area code and phone number to a private branch exchange (PBX).

When these numbers arrive at the PBX, they are handed off to a processor from Aristacom International, Inc. in Alameda, Calif., which scans a customer file

from a DB2 database on one of Whirlpool's IBM 3090 mainframes. If a match is found, both the call and the associated customer file are sent to a customer service agent.

Whirlpool's Lockwood seeks to improve service

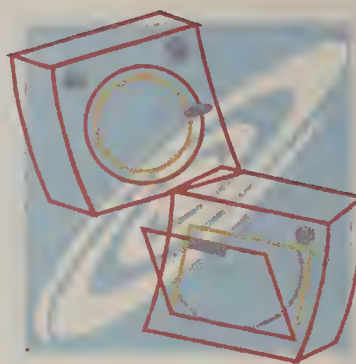
Among other features, the Aristacom system can also

route subsequent calls automatically to the last agent the consumer spoke with.

Finally, an expert system from Palo Alto, Calif.-based Aion Corp. is available to help agents diagnose the specific cause of a customer's equipment trouble and recommend a solution.

In the future, Whirlpool said, it may add a remote-access feature to the centers, enabling field repair personnel to log on and use both the expert system and the product literature databases.

Lockwood said the three technologies were picked in response to a detailed survey Whirlpool conducted in 1988 that asked consumers to define "excellence in service."



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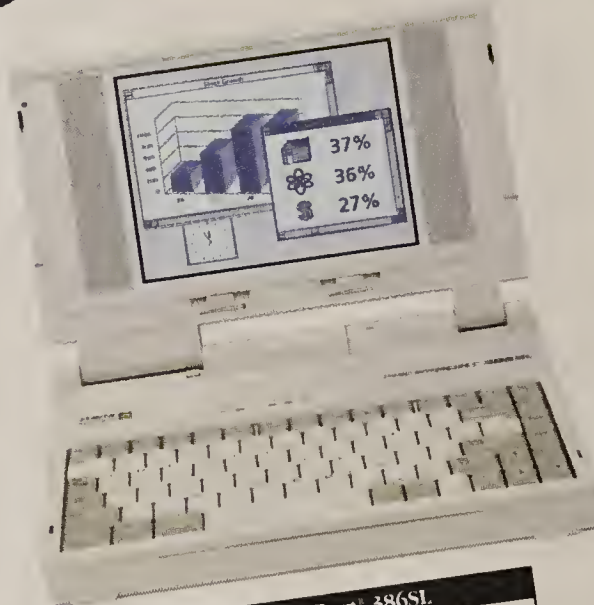
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CORRECTIONS

Due to a reporting error, the Compaq Computer Corp. Deskpro M upgradable personal computer was incorrectly referred to as the Desktop M [CW, Oct. 21].

A recent article on notebook computers incorrectly said Sharp Corp. makes the color screen for Epson America, Inc.'s notebook [CW, Oct. 14]. Seiko Epson Corp. makes the screen.

Brush Wellman, Inc.'s James Dudziak's name was spelled incorrectly in the Sept. 23 issue.

AS/Messenger sends messages from IBM Application System/400s to pagers, not paper, as stated in a new product announcement [CW, Oct. 7]. AS/Messenger is produced by Business Partner Solutions, Inc. in Hinsdale, Ill.

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AD/Cycle partners offer AIX development tools

BY ROSEMARY HAMILTON
CW STAFF

IBM's AIX applications development strategy gained substance last week as two AD/Cycle business partners announced tools for the IBM Unix platform.

In addition, an IBM executive said, the company plans an AD/Cycle-like announcement for AIX that will more clearly outline a Unix applications development strategy for both technical and commercial software development as well as identify a key set of business partners.

Last week, Intersolv, Inc. released an AIX version of its configuration manage-

ment software, and Micro Focus, Inc. announced a set of Cobol development tools for AIX. IBM said both companies' products will play a key role in the future AIX computer-aided software engineering (CASE) strategy.

"Over time, we see AIX CASE playing the same kind of role as AD/Cycle and addressing both the technical and commercial [development]," said Jon Hemming, a manager of market strategy at IBM's Programming Systems Group.

Intersolv's announcement positioned its PVCS configuration management software as a potential standard CASE tool for work groups with a mix of IBM AIX,

PC-DOS and OS/2 platforms, said Kevin Burns, Intersolv's chief executive officer.

An OS/2 version of the same tool set was announced last month.

The Intersolv product set provides management and control mechanisms for software development, including version control, tools that track distributed project components on a network and facilities to rebuild applications to reflect changes made in individual modules.

Burns said the AIX version of PVCS Version Manager and Configuration Builder were designed to look like the DOS and OS/2 versions.

"It gives the customer a way to stan-

dardize the configuration management discipline across heterogeneous workstations," Burns said.

He added that IBM and Intersolv would jointly market the PVCS Version Manager and PVCS Configuration Builder. Version Manager is priced at \$600 per seat, while Configuration Builder carries a \$250-per-seat license.

Micro Focus, meanwhile, said it would sell its Cobol compiler tools for the IBM AIX/6000, AIX Personal System/2 and AIX/370 environments. IBM plans to sell the products as well.

Micro Focus and IBM will now be marketing Micro Focus Cobol for AIX, Cobol with Toolbox for AIX and Cobol Run-time Environment for AIX. Licenses start at \$1,000.



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DEC builds Ultrix multimedia pile

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — While Digital Equipment Corp. gears up for its Halloween-week product bash Wednesday, the Unix software machine at DEC is already cranking a few early arrivals out the door.

Last week, DEC announced distributed multimedia tools for its Unix/Ultrix workstations. This week, the company will unveil a new version of DEC Fuse, Unix programming software for Decstations and Sun Microsystems, Inc. workstations at Unix Expo in New York.

DEC plans to make its multimedia mark in a different arena than personal computer vendors such as Microsoft Corp. or Apple Computer, Inc. Its focus will be in the distributed client/server environment.

"DEC is building the distributed nature of the multimedia applications on top of X Windows," said David Marshak, an analyst at Patricia Seybold's Office Computing Group in Boston. "This should appeal to companies that are not interested so much in the glitzy, fast-moving stuff but want to build strategic applications in multimedia."

Expected to be available by December, DEC's multimedia products include Xmedia Tools Version 1.0 software for developers and end users, plus Decmedia hardware options for video and audio applications on Decstation 5000 workstations. The Xmedia developer's kit is \$1,000 per user license. For Unix programmers, DEC has two offerings slated to be available in December for Decstations and in January for Sun workstations:

- DEC Fuse Version 1.1 — An integrated suite of graphical programming tools based on Unix commands and utilities, equipped with an Open Software Foundation OSF/Motif-based user interface. Price: \$1,800 for a single-user license.

- DEC Fuse Encase — A tool integration facility enabling users to integrate new and existing applications software into the DEC Fuse environment. Price: \$2,000 per seat. The product gives DEC capabilities similar to Hewlett-Packard Co.'s Softbench programming environment, said Tom Moore, an analyst at International Data Corp. in Framingham, Mass. "DEC Encase allows different products from different vendors to communicate together," he said.

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ADVANCED TECHNOLOGY

TECH TALK

Compression on a card

■ Lead Technologies, Inc., based in Charlotte, N.C., has introduced an add-in card for Industry Standard Architecture personal computers that is capable of compressing images of 1M byte to approximately 5K bytes. The company claims compression occurs at nearly real-time rates and works with a wide variety of recognized image file formats. The compression rates can be varied from 5-to-1 to 255-to-1, allowing users to store up to 160 images on a 3½-in. floppy disk, the company said.

A first for France

■ France's National Office for Aerospace Research and Studies (ONERA) recently purchased an Intel Corp. IPSC/860 parallel supercomputer with a peak rating of 7.6 billion floating-point operations per second, making it the most powerful supercomputer available in Europe, according to Intel. The supercomputer employs a parallel architecture based on 128 of Intel's I860 XR microprocessors. ONERA will use the supercomputer for mathematically intensive applications, such as the numerical simulation of complex phenomena, including fluid flow and structural analysis. ONERA serves as a computing facility for scientific, industrial and defense communities.

Neurons on networks

■ Toshiba America Electronic Components, Inc. said last week that it now has available sample quantities of its neuron chip, based on technology licensed from Echelon Corp. The neuron chip is a multiprocessor integrated circuit designed for use in low-cost, intelligent distributed control systems using Echelon's Lonworks control networking technology. It is the first complete system on a chip designed specifically to manage local sense and control processes and to reliably communicate sense and control messages over any communications medium, Toshiba said.

Getting a mummy to spill its guts

Supercomputers allow researchers to view Egyptian mummy with wrappings intact

BY MICHAEL ALEXANDER
CW STAFF

Although embalmed for centuries, an Egyptian mummy can speak volumes about its past to archaeologists and others who are trained to listen. However, getting a mummy to reveal its secrets usually means taking it apart in an autopsy in a way that does not allow it be reassembled and displayed.

Now, some archaeologists are turning to computers to help unravel the mysteries of mummies without ever disturbing their wrappings, according to Sarah Wisseman, an archaeologist in the Ancient Technologies and Archaeological Materials program at the University of Illinois at Urbana.

In September 1989, officials at the university's World Heritage Museum asked Wisseman to help them peer into the history of a recently acquired mummy. The stipulations were that the mummy be kept intact and that the project be completed within a year, in order to put the mummy on display as soon as possible.

Very little was known about the mummy, which had been acquired from a Chicago antiquities dealer. "We think from the decoration, our mummy belongs to the first or second century A.D.," Wisseman said. "We knew that it came from the Faiyum district, an oasis southwest of Cairo and a Roman and Greek settlement around the time of Christ. We don't have the tomb it came from, and no inscription on it identifies who's in there."

It was also apparent that the mummified remains were those of a juvenile. "This one had some damage, and you can actually see some of the foot bones," Wisseman explained. "Our anthropologist could see straightaway that it was not an adult but an immature individual, a child or a teenager."

The researchers turned to an X-ray machine, CT scanner and eventually, a supercomputer to probe the mummy's innards.

"What we were trying to get at was the exact age of the person inside the wrappings, its sex and any information we could get on medical history, diet, cause of death and embalming practices."

At first, the re-



Photo by Bill Wiegand. Models by Ray Evenhouse, Biomedical Visualization Dept., University of Illinois

Sculptor Ray Evenhouse with the biomedical visualization group at the University of Illinois used CT scans to create 3-D models of Egyptian mummy

searchers suspected the mummy contained the remains of a person of modest means because of what appeared to be a lack of care during embalming and the absence of amulets, which are common. X-rays revealed that the mummy had a fractured skull, indicating that the corpse might have been dropped. A radiologist confirmed the fractures occurred after death.

Once the X-rays were thoroughly studied, Wisseman sought the help of two medical clinics, which donated the use of their CT scanners.

The CT scans showed for the first time that a "stiffening board" had been put underneath the body, presumably for support. Further, the board had been carefully shaped to follow the contours of the embalmed body. The use of a stiffening board is relatively rare and usually done only for "higher class mummies," Wisseman explained.

It was not until the CT scans were fed into supercomputers at the university's National Center for Supercomputing Applications that it became more evident the child was of a higher social standing. The scans, each representing a 3mm thick slice of tissue, were fed into a Thinking Machines Corp. Connection Machine.

"We collected all those slices and stacked them in a 3-D data set, and then resampled them along the vertical," explained David Lawrance, a physician

and computer scientist. The result was a series of 1mm cubes called volume elements, or "voxels."

"What we did was a technique known as a volumetric projection, in which you model each voxel as a semi-transparent cube of data and shoot it with simulated light," Lawrance said. "Then you can rotate the data set and see it from different views. While everything is moving you get a nice, strong 3-D effect."

The supercomputer permitted researchers to examine the mummy from virtually any angle and to electronically slice through it as though performing surgery.

"Dave Lawrance's images actually strip the mummy off the board so you can see the wood grain, the knot hole and the shape of the board," Wisseman said. Further analysis on the supercomputer showed that even the edges of the board had been artfully beveled. "Somebody took a lot of trouble with that board," Wisseman said.

"What we found once we got through this process and actually had the second CAT scans, plus Dave Lawrance's renderings, was that the embalmers had taken a great deal of care with this mummy," Wisseman said. "They had wrapped the hands separately; they put extra padding over the chest to puff it out and make it more lifelike; and extra padding under the fractured skull."

Just as Wisseman was about to wind up the project, Lawrance told her he was in contact with fellow researchers at the biomedical visualization group at University of Illinois at Chicago. The group included sculptor Ray Evenhouse, who previously used CT scans to create a 3-D model of the face of a mummy on display at the Kalamazoo Public Museum in Michigan. Evenhouse subsequently agreed to create a 3-D portrait of what the mummified child in the World Heritage Museum may have looked like.



Bill Wiegand

Researching a mummy once meant taking it apart in an autopsy



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EDITORIAL

Texas tumble

Crash!

There goes another one. It's Compaq's turn to demonstrate how fleeting competitive advantage can be in a market where you're only as good as your latest hot box.

The \$70 million quarterly loss the Houston company reported last week wasn't a surprise; nor was its move to lay off 1,400 people. In fact, Compaq won praise for taking its medicine and moving forward.

But who would have predicted a year ago that the darling of the PC industry would fall so fast and so hard, or that it would be shut out from the hottest new hardware technologies?

It's true. Compaq's decision to remove itself from the show floor at last week's Comdex show saved it some embarrassment. The talk of the show was the next generation of portable computers featuring color graphics and screens you can write on. Compaq would have had precious little to show. Its only color portable entry is a 17-pound monster that should appeal largely to weight lifters and users who can't leave their desktop PCs behind. The company has nothing to show yet in pen-based technology, and its new servers don't break much ground. What's happened to the industry's most innovative firm?

Compaq hasn't stopped being innovative, but it has had trouble adjusting to some new realities in the market. Its continued undying commitment to computer dealers doesn't jive with its bold move into dedicated network servers. The typical computer shop on the corner isn't ready to give the kind of complex support that a mission-critical multiuser machine requires. Compaq blessed Electronic Data Systems as a Systempro reseller three weeks ago. Good move.

Compaq also has to sever some of its home-grown technology roots. The company has always prided itself on developing products internally, but hot color portable makers such as Epson and Dell are importing screens from Japan and promising delivery early next year. Even Apple decided that profits were more important than pride of authorship and turned to Sony to co-develop the line of notebook computers it announced two weeks ago.

The bigger issue for Compaq is perceived value and the changing priorities of business computer buyers. Not long ago, a name brand meant quality and security. No longer. The quality of components from the Pacific Rim is good enough that the really innovative PC makers are those who can assemble the "best of breed" from a dozen different suppliers and do it as cheaply as possible. Sure, there's still plenty to say for reliability and quality of service. But both can now be had from the cheapest clone makers for an extra annual fee.

Compaq is an extraordinary company with a rich history of technical innovation. No doubt it will come out of its current problems stronger and wiser. But its experience proves that the PC market is moving faster and faster toward commodity status and that letting your guard down, even for a minute, is an invitation to disaster.



LETTERS TO THE EDITOR

HP clarification

In response to "HP to drop Motorola line" [CW, Sept. 16], it is imperative that Hewlett-Packard Co. clarify this story to reflect an accurate account of HP's commitment to its Motorola, Inc.-based workstation business.

HP continues to maintain a high level of commitment to customers using or purchasing our Motorola-based workstations. These products play an important role in HP's workstation product line and continue to account for a significant portion of HP's workstation sales.

While it is true that HP is beginning a transition to its PA-RISC-based family of workstations, the company has consistently communicated its message over the past two years to provide an upgrade path to higher performance for its Motorola-based workstation users. As evidence, HP developed, in cooperation with Motorola, the 40Plus Program that will provide HP Series 400 workstation users with an upgrade to 40 million instructions per second performance or greater.

I want to assure your readers the Motorola-based workstation is alive and well at HP and continues to play an important part in our workstation business.

Lewis E. Platt
Hewlett-Packard Co.
Cupertino, Calif.

Don't blame law

In your report on the Supreme Court's refusal to hear Robert Morris' appeal [CW, Oct. 14], you write that "The refusal... leaves intact a 'bone breaker' law that could transfer otherwise law-abiding computer users

into felons and inhibit the creative uses of computer technology, according to Thomas Viles, an attorney at the Silverplate & Good law firm in Boston."

You quote Viles as saying, "A simple computer entry is of an entirely different order than the destruction of data or the intentional alteration of data."

This is the same argument that is used in the so-called "hacker ethic" to rationalize and justify what the hacker intends to do anyway. It must not go unchallenged. The very presence of a malicious user or process on a system diminishes trust in the system.

It is reckless and irresponsible to assert otherwise. It is particularly reprehensible because many of the attackers do not seem to know any better.

So far, the use of this law has been measured. While there has been some investigative abuse, that is not the fault of the law.

There is nothing in this one case to suggest that it needs to be changed. Since damage results from most unauthorized entry, I hope that potential attackers will be appropriately deterred by it.

William Hugh Murray
New Canaan, Conn.

N.J. licensing

Criteria are needed for the evaluation of competence in the computer field. This is particularly true of the specialized world of consulting.

But the New Jersey bill fulfills none of these goals. It defines "software developer" in a manner akin to Jackson Pollack's techniques for visual composition, with much less agreeable results.

Not having a clearly defined population, it consequently states its requirements for licensing in such broad terms that it might just as easily have called for general licensing of all residents of the state of New Jersey. The effect would be virtually indistinguishable.

Lastly, it seeks to evaluate its subjects via a single examination. This, given the breadth of criteria to be tested, must either be so massive as to be beyond comprehension or so superficial as to provide no evaluation at all.

Charles R. Olszewski
Piscataway, N.J.

Information systems professionals operate at several clearly separable levels, while the New Jersey bill is speaking to only one level. The logical conclusion is that either a person is competent to perform the whole ball of wax or has no competence whatever.

I suggest a bill that would work will address licensing at levels of technical expertise.

As a person with 25 years in IS, I would be ecstatic to have the state take some of my burden in evaluating competence when interviewing potential candidates for employment. On the other hand, the language of the bill seems entirely too broad.

Wanda Huntenburg
Piscataway, N.J.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

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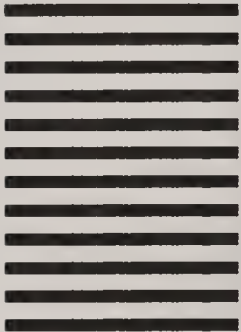
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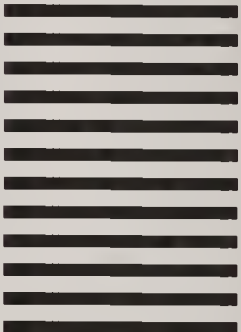
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Per-user licensing: Drive slow

Without careful planning, this good idea can turn into a fiasco

JAMES H. GEISMAN



Per-user licensing and pricing of software is becoming more common. More than 100 vendors now offer some type of per-user licensing and pricing. And, for the most part, this is good news for both companies and vendors.

As the Microcomputer Managers Association pointed out in a recent white paper, flexible software licensing helps companies by allowing them to pay just for what they need and use. Vendors also benefit because they can eliminate illegal copies by controlling the number of simultaneous users instead of the number of physical copies.

Like any innovation, however, per-user software introduces problems along with opportunities. Whether you work for a user organization or a software vendor, you must carefully work through the implications of per-user licensing. Otherwise, floating software can sink your company by lowering productivity, causing network chaos, and, if you are a vendor, by lowering revenue.

Customer considerations

It is critical for user companies to understand that what they are getting with per-user licensing is flexibility, not cost savings.

Software acquisition costs can actually increase with per-user licensing because floating software encourages more demand for applications. Even if a company is able to control demand, the impact on total costs is likely to be neutral at best because of the increase in costs associated with administration and hardware reconfiguration.

When software floats freely among a group of users, someone must administer the licenses and all the permutations of hardware and software. The fact that software may float to any PC or workstation in a network means every workstation on which an application might run must be configured properly. This entails either upgrading all hardware to the same configuration or keeping detailed records that show which workstation configuration can run which suite of software.

In addition, per-user software can create heavier loads for networks. When applications are downloaded from a centralized software library (a common way of doing per-user licensing), network traffic can increase.

And finally, companies moving in this direction must be prepared for the training and support demands of a new group of occasional users. These users will need additional documentation and training from your software supplier.

Clearly, there is a trade-off between software, hardware and

administrative overhead that must be carefully managed if per-user licensing is to be implemented successfully.

For this reason, it is wise for

ception that per-user licensing revenue will cause revenue to sink like a stone. Experience shows that this fear is unfounded — revenue does not sink but remains the same. In fact, with a little care, revenue can actually rise.

As noted above, easier access can spur demand for additional applications and, with larger

and sales operations. These costs can be controlled, however, with good advance planning and careful pacing.

One vendor, for example, found its per-user licensing scheme required changes to the software bill of materials that rippled through the systems involved with part numbering, order entry and configuration checking. It took six months, lots of staff time and a significant IS effort to fix these problems. The cost of these adjustments could have been much lower if the vendor had foreseen the need and handled them before the fact.

Keep it simple

Vendors must also take some pains to make sure that the licensing plans are easy to understand and explain. Elaborate licensing schemes with many options can confuse everyone, including the sales force that must present them to customers.

Per-user licensing can work to the benefit of both customers and vendors but only if approached carefully on both sides. Users need to do prudent planning and allow adequate lead times to establish procedures for managing pools of licenses, especially licenses that are shared across multiple networks.

Vendors need time to validate use patterns and revenues as well as develop their in-house systems and methods. Too much carelessness can spoil a good thing.

Geisman is president of Marketshare, Inc., a management consulting firm in Wayland, Mass.



Niculae Asciu

companies to move incrementally, using pilot installations to understand how software use patterns will change and phasing in per-user licensing over a six- to 12-month period.

Needed support

It is also important for user companies to be able to count on vendor assistance with some of the adjustments. Some vendors have not fully developed suitable support programs for this type of licensing.

Vendors have a common per-

groups of occasional users able to share software, companies are able to justify licensing more applications.

Vendors can also spur demand by offering new types of licenses. One vendor offers part-time licenses for short intervals during project staffing peaks. Another uses a licensing mechanism that lets some customers redistribute applications within their organization.

Per-user licensing will mean some extra costs for vendors in terms of production, distribution

You can approximate and still be correct

READER'S PLATFORM

EDWARD TESLER

Recently you published an In Depth article by Lee Gruenfeld titled "No software guarantees" [CW, Sept. 30]. I think some of its statements are incorrect and due to the obvious importance of the problem, I must present my point of view to give readers a more balanced picture.

Gruenfeld's position is that the "proving of a software program is intrinsically unsolvable." By his definition, "the goal of 'proving correctness' is to be able to state definitely that a complex piece of software does what it is supposed to do." To state what a software program is "supposed to do," we need definitions.

The most definitive definition of a program is the program itself. Since its correctness is not proven but is precisely our goal,

any definition we have is either not provable or not complete. As long as it is impossible to have a definition that is simultaneously complete and provable, it is also impossible to satisfy Gruenfeld's criterion of correctness.

The key word, of course, is "supposed," which leads to the question: Supposed by whom? Two parties are usually involved in any field of human activity — the user and the producer.

Sometimes in do-it-yourself projects, both are represented by the same person, but the process remains the same. The user is the one who determines what the product is supposed to do. The image created in the user's brain is then translated into a more tangible form.

The human brain, as a system, is very far from being perfect. Not only will different users create very different images of what a product is supposed to do, but many important details of

these images will be lost in translation.

Ask 10 people to draw a tree. They will create 10 totally different mental images, complete with smell, sound and movement of branches. Then they will create 10 different pictures, where all this information is lost. Other people looking at the pictures will again create complete images of trees but substantially

EVEN IF AN absolutely precise and complete translation is impossible, there are no limits in approximation.

different from the initial ones. They will not realize that these details are supplied by their own brains and not by the pictures.

This is exactly the problem. When a producer translates a user's wish, he re-creates the image in his brain and expands the specification as if the missing details were given by the user. In

addition, many details must be supplied by the producer simply because they cannot be supplied by the user, who lacks the knowledge required.

Of course, this means that the document generated by the producer, on the basis of which the product will eventually be created, will differ from the user's initial conception. Because any translation of the image generated by a user's brain is, by definition, incomplete in comparison to the image itself, it is impossible to create any product (including software) that does exactly what it is supposed to do.

That, of course, is precisely Gruenfeld's position. Where we part company, however, is on whether this problem of communication (or, if you prefer, miscommunication) between the user's brain and that of the producer makes a real difference as far as software is concerned.

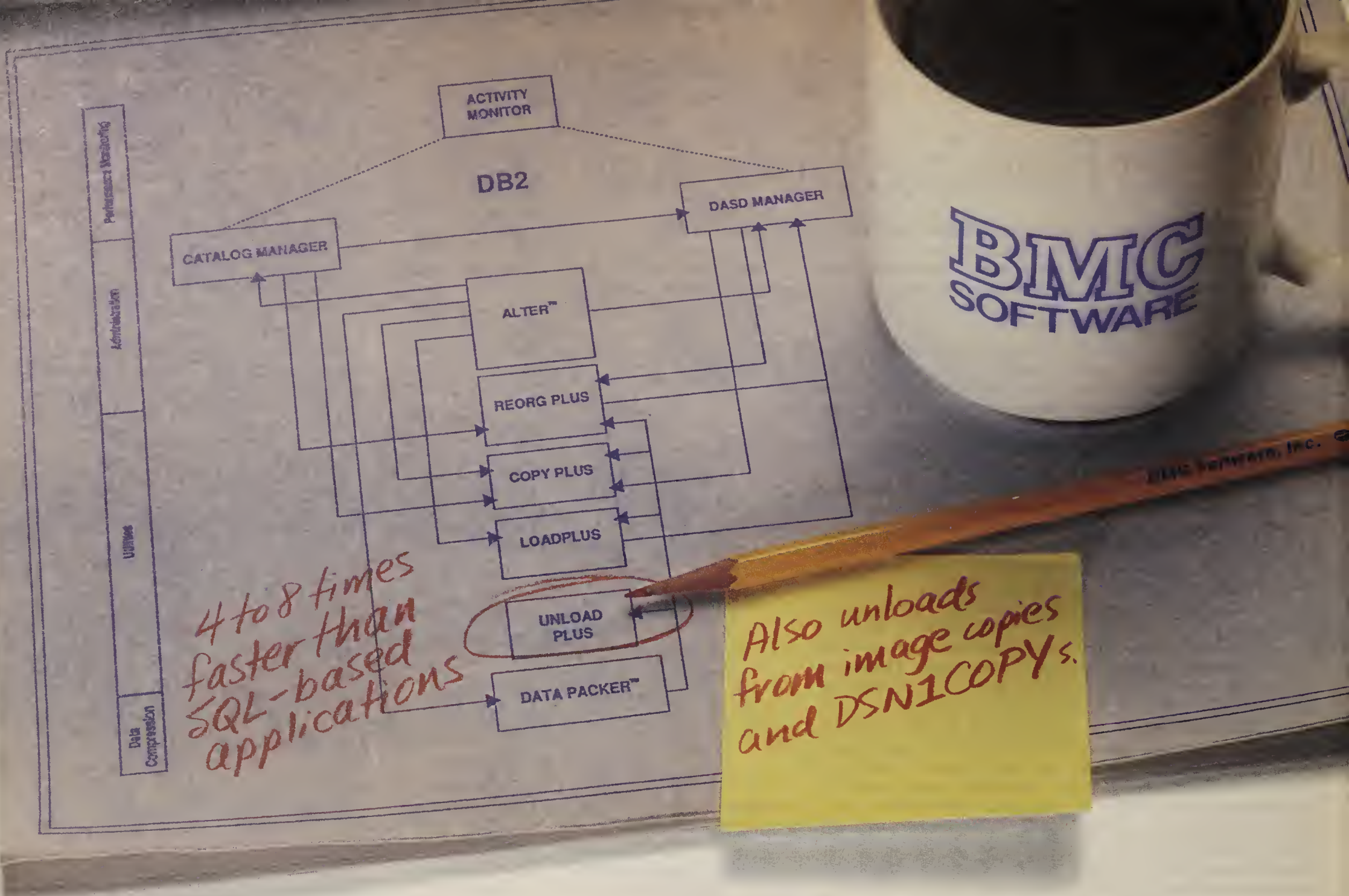
As long as neither the user nor anybody else is able to completely translate his image into any tangible form, further reference to that image is meaningless. We have no choice but to turn to the next best thing: the translation.

The good news is that, even if an absolutely precise and complete translation is impossible, there are no limits in approximation. In other words, it is always possible to make the translation as close to the original image of the supposed performance as required in given conditions. Correctness of all subsequent manipulations, as long as they are properly registered, can be analyzed and proven. For all practical purposes, this is sufficient.

As for "mathematical" correctness, that too is possible, even if not practical. Because the idea of infinity is the foundation of mathematics as we know it, there is at least the theoretical possibility of using infinite approximation to make a translation close enough to the user's brain-generated image to achieve mathematical correctness. And this remains true, even if today's technology and/or resources are insufficient for such approximation.

"Impossible" is a very strong word. I prefer not to use it.

Tesler works in information services development at Midas International Corp. in Chicago.



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SYSTEMS & SOFTWARE

SOFTWARE SHORTS Software at the mall

The **IBM Information Network** has announced Software Mall — an on-line facility that supports electronic outlets called “stores,” which are operated by software vendors or “store owners.”

Offered by the Information Network via IBM-Link, Software Mall is an electronic customer support service. It allows a store owner to provide electronic support services for programs that are compatible with an operating system licensed from IBM.

Subscribers can browse a mall directory to locate stores and programs that interest them. An IBM-Link user ID is required.

The service will be available Nov. 15.

Powersoft Corp. in Burlington, Mass., announced that it has signed marketing, training and service agreements with several European software vendors, including Admiral Software Ltd. in the UK and Milestone Software GmbH in Germany. The agreements are for Powersoft's Powerbuilder client/server tool set.

Powersoft cited Forrester Research, Inc., a market research and consulting firm, saying the U.S. market for client/server software will grow from \$256 million in 1990 to \$5.2 billion in 1995.

Insurer looks to IBM 3390s for savings

BY ROSEMARY HAMILTON
CW STAFF

Blue Cross Blue Shield Mutual of Ohio expects to save more than \$1 million during the next two years by replacing older IBM disk drives with the new models the company introduced last month.

The company is an early user of the new 3390 Model 3 units and began installing them as replacements for the IBM 3380 K units during the first week of September. The Model 3 is the latest device in the 3390 series of IBM's high-end direct-access storage device, which was introduced two years ago as the follow-on generation to the 3380s.

The Model 3 was rolled out along with a host of other storage options as part of IBM's Enterprise System announcement in early September.

Last week, information systems managers said the Model 3 has not wowed them with its performance. While they expected slightly better performance than the 3380 Ks, they found it runs at the same level. However, the new unit costs less, holds multiple gigabytes more data and takes up far less floor space. These three factors combined make up for any performance issues, Blue Cross said.

Substantial savings

The company expects to save \$1.2 million because the new units cost an average of 20% less per megabyte than the 3380 K units, said Pete Celestina, a senior hardware specialist. In addition, the company was able to lock in what he called an “effective lease rate” because it ordered the units before the September announcement.

Celestina said he expects to pay about \$32,000 per month for the Model 3s, compared with the \$70,000 monthly charge for the 3380 Ks. He said there is also additional environmental savings. Because the units are smaller and more economically designed, they have less costly power requirements.

Previously, the company used 23 3380 K devices to store a total of 175G bytes. Today, the company is storing 180G bytes on six Model 3 units. With the installation of these units, Blue Cross was able to free up 334 sq ft of data center space, Celestina said.

The company also stores about 320G bytes of data on 3390 Model 2s, which are better performers than the Model 3 units, according to Blue Cross. For example, the Model 3's access time is 15 msec, while the

Model 2 runs with an average access time of 12 msec.

As a result, IS is in the process of balancing out its workload to better use the Model 2 for high-activity applications and the Model 3 for its increased storage capacity.

“The Model 2 seems to be more performance-driven,” said Frank Gliha, manager of technical services. “The Model 3 is more a capacity drive.”

Overall, Blue Cross is satisfied with the new IBM disk drives and said there has been only one “minor outage” since early September. This is particularly important to Blue Cross, which was one of the IBM customers in the late 1980s that was plagued with 3380 K problems. Eventually, it had to replace 70 Head Disk Assembly units to effectively run the 3380 Ks, Celestina said.

Financial tool tallies all the hits and errors

ON SITE

BY MARYFRAN JOHNSON
CW STAFF

LOS ANGELES — When the L.A. Dodgers, Inc. signed Darryl Strawberry to a five-year contract with a sizable bonus, it probably never occurred to the star hitter that he had just become an amortized fixed asset.

Not that Strawberry needs to worry about it anyway.

That job falls under the purview of the Dodgers' MIS and accounting departments, which use Lawson Associates, Inc. financial software to keep tabs on some 300 major and minor

league players on an IBM Application System/400 computer.

“Baseball has a ton of unique situations for accounting, but the most glamorous examples are the players,” said Bill Foltz, director of accounting and finance for the Dodgers. “Tracking these guys is a big task. If we sell them or trade them, we treat it like any fixed asset. We have to write them off.”

Until last year, when the ball club upgraded from an IBM System/38 to an AS/400 Model B45, that tracking job was handled manually by the six-member accounting staff. “It was ugly,” Foltz recalled.

The Lawson software proved

flexible enough to modify the program so signing bonuses could be amortized or written down over a period of years, he explained. Flexibility is particularly important when expenses take a sudden jump, say when a \$150,000 player gets traded for

utation for leading the way. The organization's in-house-developed ticketing package, for example, has been purchased by the Minnesota Twins, the Detroit Tigers and the St. Louis Cardinals.

Along with the major league club, the Dodgers have working agreements with nine minor league teams in the U.S. and abroad. The team's home games in Dodger Stadium drew 3.3 million fans this year — the third highest attendance in its history.

“Baseball is no longer a cottage industry,” Foltz said. “It's become big business, so it requires a greater level of sophistication than has been displayed before in this industry.”

“That's happened very quickly with the jump in TV revenues and players' salaries,” he added. “When your team payroll is over \$30 million a year, it forces you

Continued on page 32



a \$600,000 one, Foltz added.

Despite the big-money environment of professional sports, the advantages of computerization have come slowly to baseball. Yet the Dodgers have a rep-

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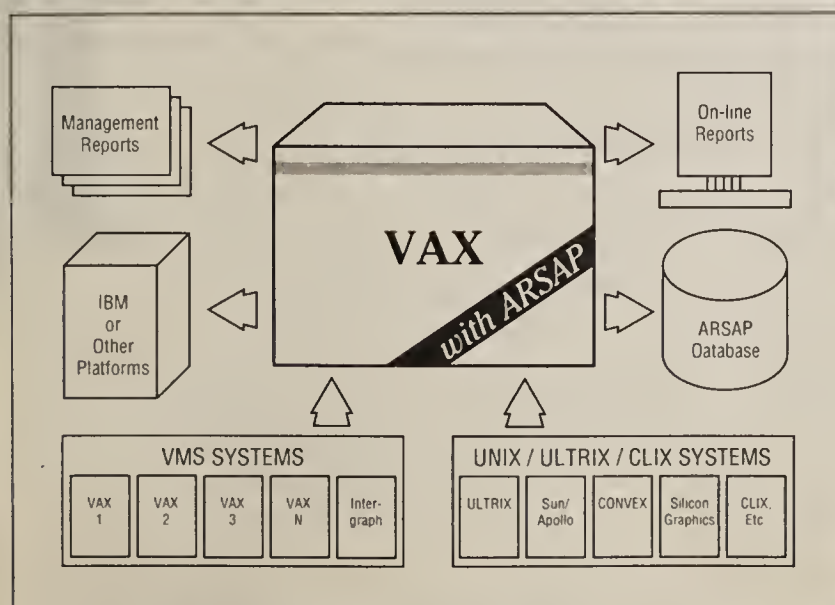
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In the 1980s, the office fell in love with technology. In just that decade, over \$679 billion was spent on information technology.

More than 60 million personal computers were purchased. The power and speed of those computers soared by 1900%.

And by 1990, American business was investing seven times as much in information technology per employee than in 1980.

OK. What did we get in return?

White-collar productivity rose less than 1% a year during the 1980s.

Today, only 5% of all business information can be accessed by computer. 95% is still trapped on

paper. Or worse, lost.

The typical executive spends 3 hours a week doing nothing but looking for information. And up to 20% of his or her time performing clerical tasks with information.

So what went wrong? Why hasn't office productivity kept pace with technology? What's the missing link?

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OFFICES THAT WORK

A 'framework' for diversity

General Dynamics eases data transfer among distributed databases

ON SITE

BY JEAN S. BOZMAN
CW STAFF

SAN DIEGO — General Dynamics Corp. is trying to turn upside down the traditional view that databases on distributed systems exist only to funnel corporate data into the mainframe.

When the company designs and manufactures Tomahawk cruise missiles at its Convair division here, it merges the data stored on Unix workstations and on minicomputers with corporate data stored on an IBM 3090-600 mainframe.

However, an expanded set of distributed database systems will be scattered among work groups and will be able to communicate with one another. Convair information systems managers want to design "work-flow managers," pieces of software that make database updates flow through the network much as goods flow through a factory. "We've decided to distribute the data closer to the people who control the [design and manufacturing] process," said Bob Abramson, manager of distributed systems.

Architectural ease

The Convair division decided two years ago to work with Digital Equipment Corp. to develop a "framework" that would ease the transfer of design information stored on different computers. "We want to start designing for continuous change," explained David Kray, manager of computer integration here. "People used to think about writing translations between different databases that we have

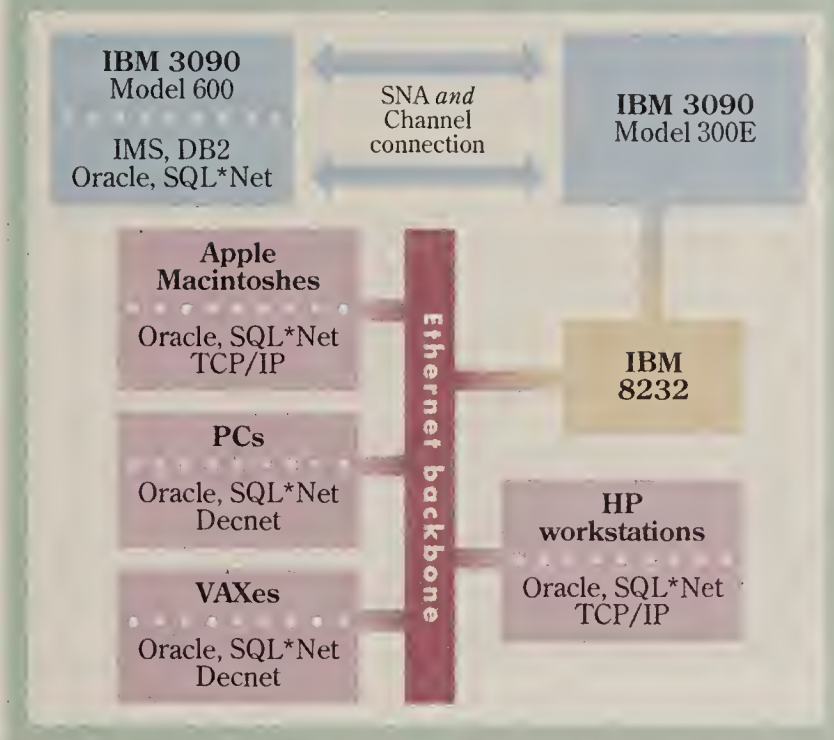
acquired," he said. "We would rather build a meta-data dictionary, or repository, that can be accessed by all applications."

That central data dictionary would "point to" the location of data scattered throughout the enterprise. But much work remains to be done before Con-

databases exchange information, but more functions need to be added. The scattered Oracle databases, connected through its SQL*Net communications software, reside on many types of computer platforms (see chart). One Oracle database already sits on the IBM 3090 mainframe

Connections

General Dynamics has set up links among Oracle databases on diverse platforms and IBM databases



Source: General Dynamics Corp.

CW Chart: Marie Haines

vair's "framework" can be considered complete. Convair is evaluating Control Data Corp.'s Engineering Data Library as one candidate for the data dictionary. IBM's DB2 has been rejected as a repository because Convair wants to standardize on open systems and does not want to depend on IBM systems alone. No new DB2 applications are being written, IS managers said.

The Oracle Corp. and IBM

complex, while distributed Oracle databases exist on multiple VAX computers and on engineering workstations, including workstations from Hewlett-Packard Co. and Apple Computer, Inc. Macintosh II machines.

An essential part of the "framework" concept is an integration strategy that removes the communications problems that prevent an easy interchange between computers. One such

link between dissimilar systems came this summer, when the Convair division merged all of its text databases. Since July, any workstation, terminal, IBM-compatible PC or Macintosh on the Convair campus can access the same set of corporate policy manuals — all maintained online under Information Dimension, Inc.'s Basis system. The same text database can be accessed remotely from other General Dynamics sites.

Physical communication between the VAX computers and the IBM mainframe is accomplished through software from Interlink Computer Sciences, Inc. in Fremont, Calif. The Interlink software ties IBM's Systems Network Architecture network to DEC's Decnet and Ethernet networks. Convair uses Transmission Control Protocol/Internet Protocol networks to connect the Unix workstations to VAX host computers. Real-time updates between the database engines will be enhanced with two-phase commit protocols, scheduled to be shipped with Version 7.0 of the Oracle database in 1992.

Hanging in the balance

Overhanging the entire project is a degree of uncertainty caused by General Dynamics' decision last month to outsource most of its computer infrastructure to Computer Sciences Corp. in Los Angeles [CW, Sept. 30]. On Nov. 1, some 2,500 General Dynamics IS staff members will go to work at CSC, saving it hundreds of millions of dollars.

The IS managers in this division are not sure their long-range plans will go unchallenged.

While CSC's intentions regarding the Convair plans are not yet formulated, one thing is clear: The distributed data scheme must be justified on the basis of how much money it will save General Dynamics.

Firm vows accelerated SQL queries

BY JEAN S. BOZMAN
CW STAFF

LOS GATOS, Calif. — A small Silicon Valley firm is trying to sell users and vendors alike on a technology that will speed up complex SQL queries to relational databases that hold a million rows of data — or more.

The 5-year-old firm, Red Brick Systems, Inc., said earlier this month that it would market its SQL optimizer, called Gold Mine, to systems vendors and database firms.

"The speed of querying RDBMS systems in general is unacceptably slow," asserted Ralph Kimball, founder and president of Red Brick. "There has been a lot of emphasis on front-end tools and on putting data into these databases, but there are serious problems with database performance."

Complex, open-ended queries to IBM's DB2 on an IBM 3090 mainframe or to Oracle Corp.'s database on a VAX 9000 can sometimes take hours to complete, Kimball said. Those lengthy queries are running against data held in each of the databases' millions of rows. Many information systems shops guard against such open-ended queries by limiting access to database extracts.

Looking for partners

The 32-person firm has installed the software at more than 20 IS organizations, in an effort to gain "technology partnerships" with major database sites. One such site is A. C. Nielsen Co. in Northbrook, Ill., which intends to modify it for use with a worldwide database query system, Nielsen software designers said.

Gold Mine might ultimately be embedded in a variety of database products from other vendors. "It's certainly going to be a more noticeable benefit in large, complex database environments," said Clare Gillan, an analyst at International Data Corp. in Framingham, Mass.

Kimball claimed the Red Brick technology could cut processing times by a factor of 10 in many cases. Algorithms in the Red Brick product can preprocess complicated "joins" between different database tables. The product works by building intermediate indexes to the contents of various relational tables.

"We've mapped out the join paths, so the SQL query is transmitted directly into a list of data records to be retrieved off the disk drives," Kimball said. Red Brick software ranges in price from \$50,000 to \$250,000.

Legent eyes distributed systems management

BY JOHANNA AMBROSIO
CW STAFF

VIENNA, Va. — Legent Corp. will enter the distributed systems management market next year, executives said.

To do so, Legent, based here, will rely on the as-yet-uncompleted acquisition of Spectrum Concepts, Inc. in New York. Spectrum's file-transfer and software distribution packages allow customers to distribute software to many users from one central point. Legent announced an agreement in principle to acquire Spectrum earlier this month [CW, Oct. 14].

Early next year, assuming the

acquisition goes through as planned, Legent will integrate the Spectrum packages with its Mics, Endeavor and Bundl product lines. The result will be these and other existing Legent software packages running across more hardware platforms and a basis for Legent to build new systems management software. This software will allow users to perform the traditional tasks of chargeback, performance monitoring and planning in a network of distributed systems.

"First we will build an infrastructure, then populate that with applications," said Bob Yellin, Legent's vice president of technology. "We will create a

distribution platform in every workstation that applications can run on top of." Spectrum's products will provide that framework, he said; they run on networks that support LU2 or LU6.2 protocols.

On to something new

In addition to the management of far-flung computer networks, new markets for Legent will include electronic information management, which includes remote printing, archiving and viewing information on-line. The company is also going to introduce next year a family of software-metrics products to measure software effectiveness and quality. Another area will be distributed collection management — collect data, store it and forward it to another computer on a network.

Legent executives said this approach differentiates it from

other vendors also entering the market for distributed systems software. "We want to build new systems management applications that are based on the distributed model, not just port our existing products to new platforms," Yellin said.

Users and analysts reacted positively to the plans. "The Spectrum acquisition is a very good move," said William Martorelli, vice president at New Science Associates in Southport, Conn. "Those products will be particularly useful with Endeavor."

Horace Gower, vice president of information services at L. L. Bean, Inc. in Freeport, Maine, and a Legent customer, said his shop is "just starting" to do some work in the distributed systems area. "We do have several hundred micros, and we'd love to have some centralized control over them."

Red Cross devises interim computer use plan

BY JEAN S. BOZMAN
CW STAFF

WASHINGTON, D.C. — Five months after it announced an overhaul of its computer infrastructure, the American Red Cross has come up with an interim plan for computer use at its 52 regional blood centers. The Red Cross — which provides half the nation's blood supply — said earlier this month that its cost for the overhaul would exceed the \$120 million originally budgeted, but it stopped short of saying how much the total cost would be.

While systems designers begin work

on a new centralized system due for completion in 1994, local Red Cross chapters will use a software system developed at the Boston regional blood center. By 1993, all blood testing will be moved to just 10 regional labs, each running identical software on a Hewlett-Packard Co. HP 1000 minicomputer.

The first step of the computer plan is to clone a successful computer system used by the Red Cross' Boston center. The Boston system runs on Unisys Corp. A series mainframes, but the Cobol-based administrative program can be adapted for other computers, said Mark Cochran, general manager of Blood Computer Sys-

tems at the Red Cross.

This interim solution should reduce the number of software packages from 28 to only eight different programs nationwide. Until May, the Red Cross had been using more than 10 hardware platforms, including the IBM Application System/400, the HP 1000s and the Unisys A series computers. But standardization will mean fewer systems, many of them centralized. Eventually, most of the computers at the local blood centers will be personal computers or workstations accessing one of several national databases, Cochran said.

Starting in January, a team of 25 will

start to architect a next-generation computer system — possibly including centralized mainframes in Washington. That system is expected to be completed in 1994. "We're running a little counter to the trend toward distributed processing," Cochran said. "Our goal is to ensure that the users can't change the software — it has to be exactly the same in all cases."

As an alternative to a single mainframe, the Red Cross is also considering the use of networked minicomputers accessing centralized databases.

Detailed plans for the next-generation computer system will be outlined sometime next year — when the redesign team will ramp up to 60 people, Cochran said. One key consideration: Any new system must be able to access a centralized database called the Donor Deferral Registry — a list of donors that the Red Cross has disqualified.

The computer overhaul is accompanied by a hard look at systems that failed often enough to cause multiple safety citations by the Food and Drug Administration. Those citations forced the permanent shutdown of two of the Red Cross blood centers in 1990.

"For us, it's a change in philosophy, as much as it's a change in systems," a Red Cross spokeswoman said. "We're moving to what pharmaceutical companies call a good manufacturing process."

High profile for low emissions

BY J. A. SAVAGE
CW STAFF

Many companies that make low electromagnetic radiation VDTs have been doing so quietly, but Wyse Technology, Inc. is attempting to use a high profile to promote its line of monochrome terminals available for a \$40 premium.

Some lawyers, such as Washington, D.C.-based Terry Mahn, said that computer companies face an unpleasant choice: If they do not trumpet their low-emission products, they miss a marketing opportunity. If they make a marketing splash, customers may interpret it as a sign that the vendor sold them unsafe products beforehand.

Companies such as Apple Computer, Inc. and Sun Microsystems, Inc. are quietly bundling low-emission terminals into their products.

Wyse claims its terminals meet Sweden's tough emission standards. Arthur H. Lipton, senior vice president of the company's Terminals and Display Products Division, said that the tilt, swivel and antiglare functions of the monitor make it ergonomically sensible. Additionally, its keyboard is highly sensitive to tactile pressure to help make repetitive motion easier.

Lipton said that although no solid evidence is available to prove that electromagnetic emissions from VDTs are harmful, "we want our customers to have the option." Low emissions and their ergonomic properties will allow the terminals to be sold in Sweden.

The low-emission line consists of three terminals: the WY-150ES, WY-160ES and WY-185ES. Prices range from \$539 to \$669, depending on resolution quality. They are available immediately.



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Financial tool tallies baseball hits and errors

FROM PAGE 27

to become more sophisticated."

One sign of that sophistication is an executive information system (EIS) called Lightship, from Pilot Executive Software in Boston, which the Dodgers' MIS department is beta-testing now.

The goal is to provide the Dodgers' upper management team with an easily accessed, graphically displayed breakdown of financial information such as per capita spending at ball games, attendance figures and player salary comparisons.



Dodgers' Mularky: Switching to AS/400 a challenge

The data feeding the Lightship EIS will be downloaded from the AS/400 to a network of 60 IBM Personal System/2s, MIS Director Mike Mularky said.

The process of downloading data from the AS/400 is "still very challenging," Mularky noted. In moving from the old System/38 to the AS/400, his department found some loss of emulation and hot-key features with PC support on the AS/400.

The five-person IS department is also developing a player

tracking system to follow talent through the scouting, draft and signing stages.

"We input all the information on each player and then track them through the minor league system, recording their bios and stats," Mularky said.

On the customer service side of the business, IS pays a lot of attention to refining the buying and selling of tickets.

"In L.A., we are competing not only with other sports organizations but with everything else for the entertainment

dollar," the MIS director said. "We want to get better seat locations into customers' hands in a more convenient and quicker manner."

One module of the ticketing system, for example, tracks every incoming call to make sure it gets resolved one way or another, Mularky said.

The retail environment for major league baseball also presents unusual challenges for both IS and accounting.

There are mail-order and gift shop operations working year-round, as well as novelty stands in the stadium with all vendors working on a cash-basis commission.



Dodgers' Foltz: Tracking players a key concern

Andersen eyes utilities

BY ELLIS BOOKER
CW STAFF

CHICAGO — Andersen Consulting this month switched on its first client/server architecture for a vertical market.

Work/1 Cooperative, a software system for utility companies, is the first of a family of cooperative processing systems for Andersen's other industry markets, which include financial services, government, telecommunications and health care.

The software was developed in conjunction with BC Gas, Inc. in Vancouver, British Columbia, using Foundation for Cooperative Processing, the client/server version of Andersen's popular computer-aided software engineering tool that was announced in April.

BC Gas has been running the software in test mode and plans to go live with it next month.

Work/1 uses IBM's DB2 on the mainframe and OS/2 and the OS/2 Presentation Manager graphical user interface on IBM Personal System/2 client workstations.

It calls for Token Ring local-area networks and supports LU6.2 communications.

Initial pricing is \$375,000 for the software license, which includes about a month of training.

Also under development, Andersen said, is work-flow software to automate the routing of documents and tasks between individuals and departments.

ware for MVS. Improvements include a job management facility with job control language, symbolic substitution and increased performance.

Goal Systems
7965 N. High St.
Columbus, Ohio 43235
(614) 888-1775

Isogon Corp. has announced a new version of Spiffy, its performance enhancement software for MVS ISPF/PDF systems.

The product improves performance of major functions such as Edit and Browse used by application programmers. Spiffy Version 4 reduces overall processor use and the number of I/O operations required to access member lists and sequential files. It also offers mouse support for personal computers running terminal emulations, the firm said.

A perpetual license including one year's maintenance costs from \$9,500 to \$31,000, depending on hardware configuration.

Isogon
330 Seventh Ave.
New York, N.Y. 10001
(212) 967-2424

NEW PRODUCTS — HARDWARE

Processors

Encore Computer Corp. has announced the Encore 93 Series.

The series is intended for real-time and on-line transaction processing applications. The systems include four to 32 Motorola, Inc. 88000 processors and 64M to 640M bytes of main memory. They support over 100G bytes of on-line storage through multiple high-performance small computer systems interface channels. Pricing starts at \$159,900.

The company also announced the Encore RSX System, which offers up to 16M bytes of cache memory.

The Encore RSX System provides both a native reduced instruction set computing mode and support for code from the company's Concept/32 systems. Pricing ranges from \$149,400 to \$249,900.

Encore Computer Systems
6901 W. Sunrise Blvd.
Fort Lauderdale, Fla.
33313
(305) 587-2900

Storage

Clearpoint Research Corp. has announced a disk subsystem that attaches directly to the VAXBI peripheral bus.

The DSB-D02 5¼-in. Disk Subsystem connects up to seven drives to a single host adapter. High-performance, small computer systems interface drives are supported, with capacities for each drive ranging from 760M to 1.2G bytes. Data transfer of 4M byte/sec. is supported by the controller.

Pricing for a subsystem with a single 760M-byte drive is \$15,300.

Clearpoint Research
35 Parkwood Drive
Hopkinton, Mass. 01748
(508) 435-2000

Quarterdeck Systems/Fathom Technologies has announced a multifunctional optical laser drive storage system for the IBM Application System/400 market.

The Laser 21M platform provides access to both write-once read-many and rewritable magneto optical media through a single interface. The system's jukebox holds up to 32 disks for a total of 21G bytes of storage capacity.

The product costs \$72,000.

Quarterdeck Systems/Fathom Technologies
4665 Nautilus Court
Boulder, Colo. 80301
(303) 530-3677

Soltronics Ltd. has introduced 8mm and 4mm tape stackers.

The Protec 50 8mm stacker offers random and sequential access and allows users to switch to any tape in a 16-tape stack in fewer than 10 seconds, the firm said. It is priced at \$4,500. A rack-mount version is also available.

The Protec 10 4mm stacker can be used with all 5¼-in. and 3½-in. digital audio tape drives. It is priced under \$4,000.

Soltronics
11558 Sorrento Valley Road
San Diego, Calif. 92121
(619) 792-2603

SOFTWARE

Development tools

Native Software, Inc. has announced Tools/4++ for the IBM Application System/400 platform.

Tools/4++ is a collection of RPG and Cobol programmer productivity aids. It includes a program generator, a source comparison utility, a file/member/data locator utility and source-code version control.

Common programming functions are accessible through hot keys.

The product is available immediately for \$995.

Native Software
9210 Arboretum Pkwy.
Richmond, Va. 23236
(804) 330-7100

Applications packages

Newgeneration Software, Inc. has announced a new release of Guardian Spirit/Lite for the IBM Application System/400 platform.

Guardian Spirit/Lite is a message monitoring and paging software application. Release 2.0 allows users to monitor expected messages and alert an operator if those messages do not arrive. It also sends predefined and impromptu pager messages.

Pricing ranges from \$895 to \$2,495, depending on AS/400 model.

Newgeneration Software
Suite 195
1010 Hurley Way
Sacramento, Calif. 95825
(916) 920-2200

Graphic Response Systems, Inc. has improved Pay/400.

Pay/400 is a payroll software package for IBM Application System/400 computers. Release 9.0 incorporates on-line analysis of employee earnings and benefits as a standard feature.

It also automates retroactive pay functions and minimizes data entry requirements, the firm reported.

Pricing for the software ranges from \$6,000 to \$80,000.
Graphic Response Systems
4940 Canada Way #315
Burnaby, British Columbia
V5G 4K6
(604) 294-0290

Auto-trol Technology Corp. has announced its electronic publishing software applications for the Hewlett-Packard Co. Apollo

Model 425 workstation platform.

The products include Tech Illustrator, a monochrome or color package for producing technical graphics, and Tech Image, which controls Adobe Systems, Inc. Postscript-compatible output from the illustration software.

Pricing ranges from \$15,000 to \$30,000 for the package, depending on configuration.

Auto-trol Technology
12500 N. Washington
Denver, Colo. 80241
(303) 252-2215

Utilities

Advanced Data Management, Inc. has released an upgrade of its Personal Job Scheduler (PJS) mainframe software.

Users can schedule batch processing jobs to be performed automatically with the PJS software. Processing less critical applications at off-peak times improves system performance and availability, according to the company.

PJS runs under TSO/ISPF on MVS/XA and MVS/ESA mainframes. A permanent license costs \$22,500.

Advanced Data Management
15 Main St.
Kingston, N.J. 08528
(609) 799-4600

Goal Systems International, Inc. has announced availability for the Catalog Recovery and Early Warning System (Crews) for MVS.

Crews performs maintenance functions such as finding "ghost" data sets and data sets that are in wrong user catalogs, the company said. It also automatically performs catalog backup, restore and recovery functions. Pricing ranges from \$5,950 to \$10,000.

The company also announced Release 2.2 of its Jobtrac automated production control soft-

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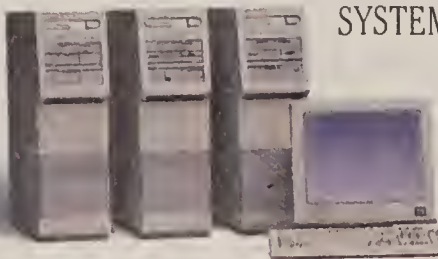
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When Volkswagen de México shifted to a new system for RDBMS-based inventory management they parked at Sequent.



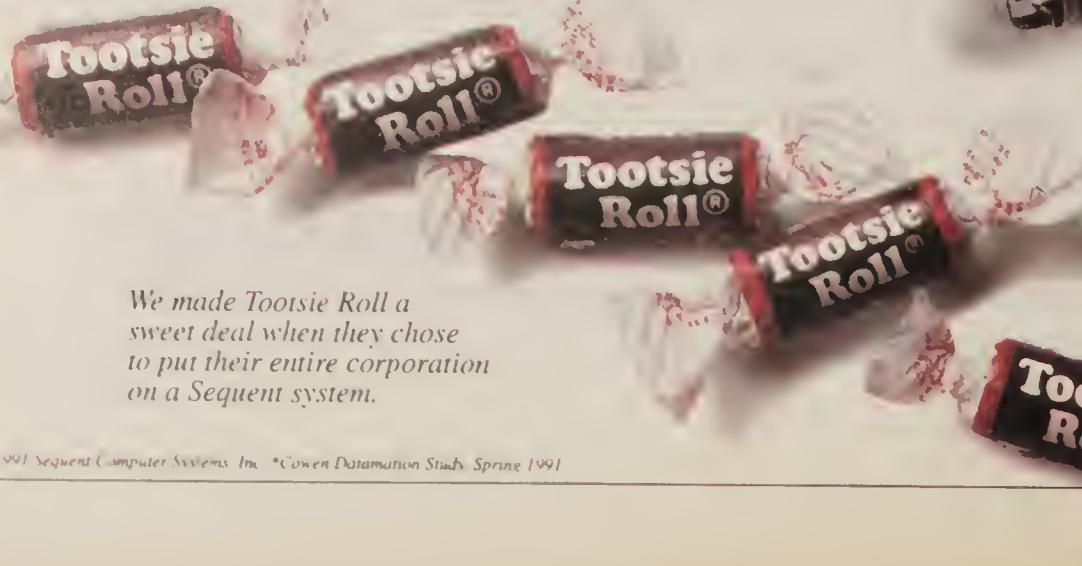
Texaco's Latin America/West Africa division needed a financial accounting system and they came to Sequent for full service.



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PCs & WORKSTATIONS

COMMENTARY

J. A. Savage

ACE in the hole? Not!



It's Indian summer in Northern California and the blue blue sky and the blue blue Pacific melt into each other in one beautiful indigo. This isn't about Big Blue, but there's a metaphor in here about the seamless progression between two planes. Only there seems to be an oil tanker stuck on the horizon.

I'm talking about ACE, the Anything-we-want-it-to-be Computing Environment.

In April, ACE was sprung on the world with a bunch of big companies and a confused message. Overall, it seemed like a good idea — a few new operating systems would take existing applications and run them across Intel and Mips Computer Systems-based platforms. Developers wouldn't have to worry about spending time and money porting to two platforms; they would only have to port to an operating system, and the rest would be free sailing. Users would get the benefit of thousands of applications that would run on both platforms.

As parts of ACE settle out, it doesn't appear all that useful to anyone except the vendors involved.

First there are a bunch of op-

Continued on page 43

IBM multimedia: An alluring vision

Third-party developers hail commitment to DVI

BY MICHAEL FITZGERALD
and CLINTON WILDER
CW STAFF

IBM billed its recent multimedia announcement as the "broadest array of flexible, cost-effective multimedia products and solutions ever offered by any company in the field," but it offered little of substance — most of the products will be delivered later.

Still, third-party multimedia developers hailed the announcement as a statement of IBM's commitment to the market and a big step toward true multimedia standards.

"IBM will have more than 150 salespeople dedicated to selling multimedia solutions," said Mark Bunzel, president of multimedia applications developer Avtex Research Corp. in Campbell, Calif. "That's what is needed to push a new technology — not just proclaiming it a standard but building an installed base."

At least one user agreed that the wait for new products will not be an anxious one.

"It shows IBM's commitment to DVI, which a year ago I was not too sure of," said Leon A. Murphy, manager of Bethlehem

Steel Corp.'s multimedia applications team. Murphy added that it validated his team's earlier gamble to center much of its multimedia development around DVI. "We look like we were real smart. Our strategy has tied in with IBM, Microsoft and Intel's strategy." DVI is Intel Corp.'s name for the family of multimedia products that it co-develops with IBM. Intel purchased the technology from the General Electric Co. Sarnoff Research Center in Princeton, N.J., in 1988.

IBM's push into multimedia centers on a new brand name, Ultimedia, and includes a new multimedia personal computer, developer's tool kits, live desktop videoconferencing and educational products. Analysts called it more business-oriented than the prior week announce-

ment by the Multimedia PC (MPC) consortium, a group that is also working to establish a desktop multimedia standard.

"MPC has all the hoopla. They have the minimum [hardware] specification and are looking to penetrate every PC that exists, but how much multimedia can you do on a 286?" said Richard Zwetckebaum, senior analyst at International Data Corp. in Framingham, Mass. "IBM is focusing more on business, government and education, and

while there's a big cross [between MPC and IBM] in education... [MPC] is much heavier on the mass market, the low end, and [IBM] is focused on the corporation, the government, the small businesses, the office setting."

Continued on page 43



Apple barrage yields third-party backlash

BY JAMES DALY
CW STAFF

Anxious users were not the only ones looking forward to the introduction of Apple Computer, Inc.'s long-awaited notebook and high-end Macintosh personal computers. Several third-party vendors have simultaneously launched a host of new products designed to increase the power and capabilities of the portable Powerbooks and the more muscular Quadra machines.

Early third-party entries began to trickle out at last week's Comdex/Fall '91. Among the

new products were the following:

- Software vendor T/Maker Co. unveiled the Powerbundle, a suite of applications for the Powerbook. The \$249.95 bundle includes a word processor, address book, expense report



sheet, click art and access to the American On-line service.

Powerbundle comes in a padded Powerbook carrying case that provides space for the lightweight PCs as well as the recharger and extra power supply.

It is available now.

- Global Village in Menlo Park, Calif., ups the communications capabilities of the Powerbooks with the Teleport/Lap V.32, an internal 9.6K bit/sec. modem through which Powerbook users connect to their office network over a phone line.

Double click on a screen icon, and moments later the Powerbook is hooked in, allowing users to read electronic mail, print documents on the office printer or transfer files and applications.

Teleport/Lap V.32 fits in the internal slot of the Powerbook and uses a small external tele-

phone interface model about the size of a business card. It will be available late next month for \$899.

- Micronet Technology, Inc. has targeted the high-end 900 with a series of add-ons that offer increased data protection and a performance boost for the new top-of-the-line Macintosh.

The Irvine, Calif.-based company's offerings include a disk mirroring system that provides fault-tolerant protection against hard drive failures, a two-drive disk array that provides increased data transfer speed and a removable data storage system that streamlines backups.

Prices for the new products begin at \$1,795 and go up to just under \$14,000.

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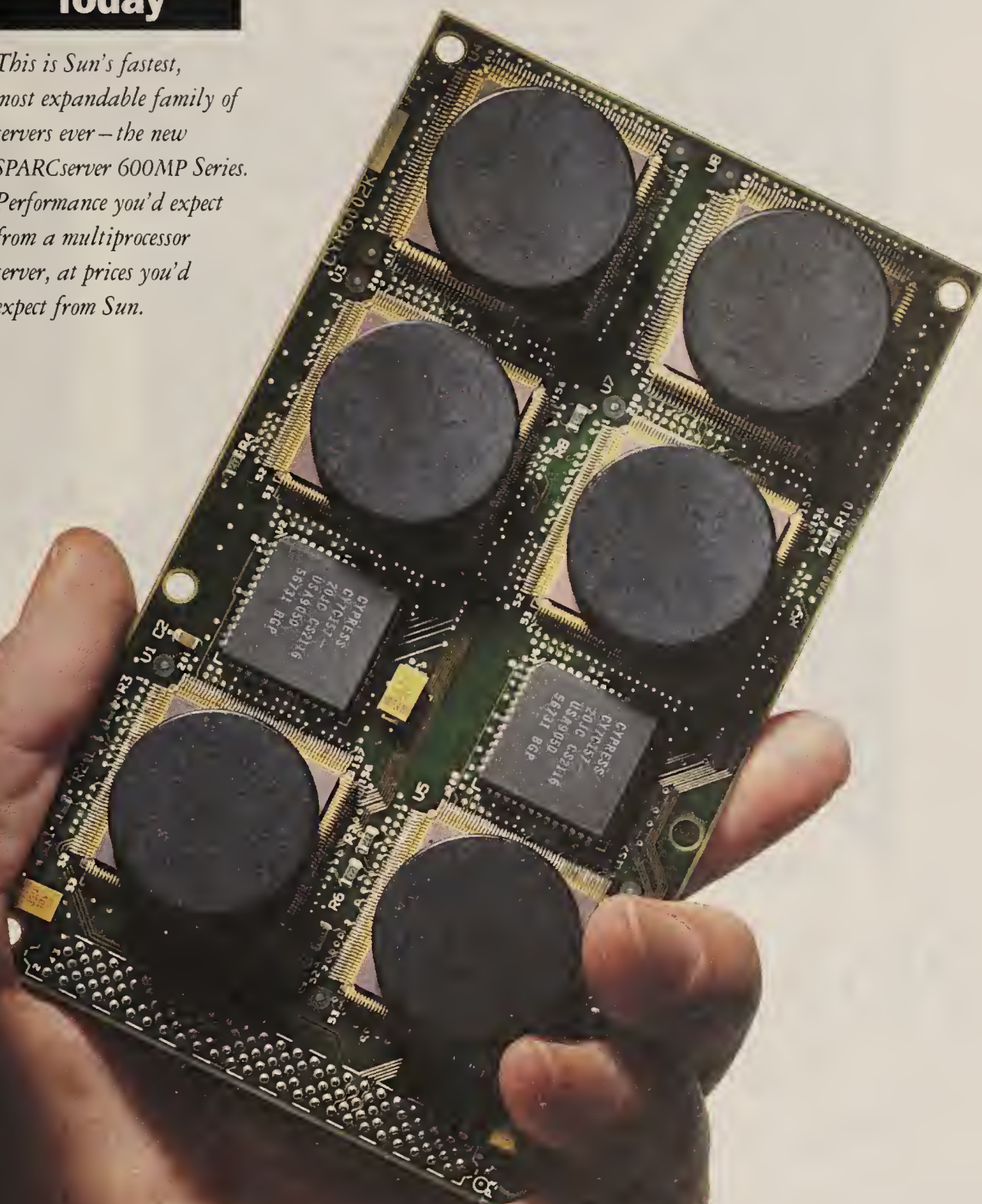
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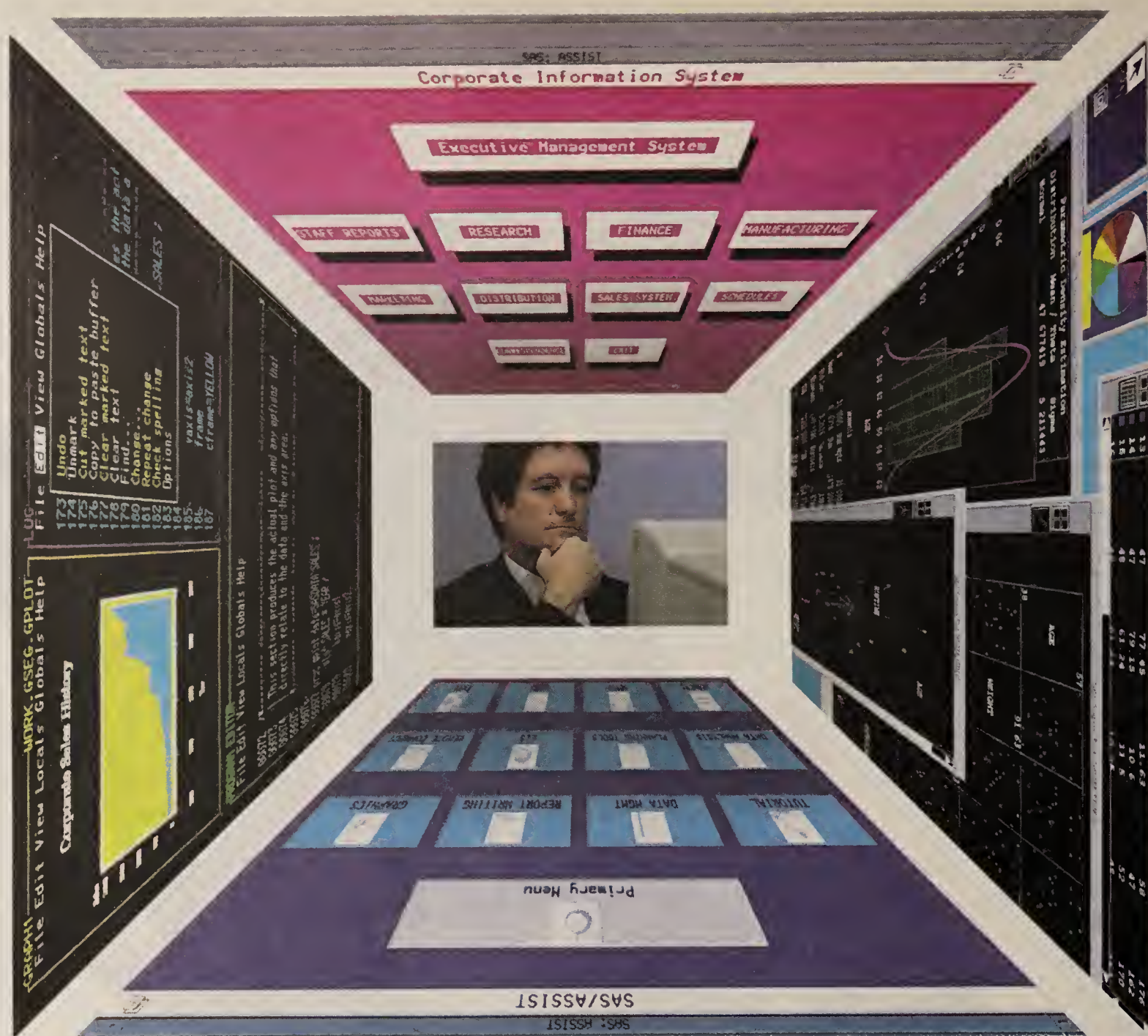
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Time to make the upgrade!

IS manages a high-tech balancing act with doughnut dynasty on the rise

ON SITE

BY J. A. SAVAGE
CW STAFF

RANDOLPH, Mass. — Beyond the whimsical paintings of plain, glazed and jelly-filled pastries that cover the halls of Dunkin' Donuts of America, Inc.'s headquarters lies the tough work of moving money from 2,300 doughnut franchises in 14 countries.

Powered by a lone Sun Microsystems Computer Corp. Sun-server 490, Dunkin' Donuts straddles the workstation and personal computer worlds while fending off a mainframe mind-set from its corporate owner, Allied Lyons PLC.

MIS Director Dave Bennett is a believer in the power of reduced instruction set computing hardware, but he is pragmatic enough to realize he cannot simply replace PCs with workstations without employee back-

lash. The problem of keeping employees comfortable with their applications is compounded with a Unix server acting as a host to those PCs. Bennett is acutely aware of shortcomings in the software trying to connect the two.

Employee considerations

The 550 employees on Dunkin' Donuts' corporate staff use PCs and the server, through emulation software, to run accounts payable and receivable, sales reporting and budgeting. They also rely on the server to develop store-level applications for franchise owners trying to set up shop, according to Bennett. They run spreadsheets, word processing and desktop publishing directly on the PCs.

Bennett said he is willing to replace PCs with Unix-based workstations despite the cost of such a change, explaining that he feels he could get a vast productivity increase. However, he

faces the challenge of making users want to change. Bennett said that users are comfortable with PC applications, and he did not



Dunkin' Donuts depends on workstations and PCs to coordinate 2,300 doughnut franchises in 14 countries

want to force change upon them. "[Even] the Windows environment is a big change for most people," he said.

Bennett said he expects to undertake Unix applications in

some field offices by the end of the year, but he still must overcome problems with the networking between PC and Unix environments. "It works for some things. I can go over the Ethernet backbone and establish a logic session on the server, but a PC cannot go out the Banyan TCP/IP gateway and mount a

block lies, except that it is in Sun's Network File System. "There have always been 'work arounds,' however, the cost of not being able to do these things without high-paid network administrators getting involved is considerable."

In search of compatibility

Additionally, he said that while both Banyan and Sun use Transmission Control Protocol/Internet Protocol (TCP/IP), "each vendor chooses how to implement TCP/IP." Bennett said that TCP/IP contains more than 100 protocols called a "stack." If every vendor implemented every protocol it would "eat up most processors, therefore only protocols seen as being important are supported by any one vendor." Bennett demonstrated by showing both hands, fingers splayed, and pushing three fingers of each hand together, leaving two on top and two on the bottom that did not mesh. Both hands represented TCP/IP, but some protocols did not match.

"It's one thing to be TCP/IP compatible, but another for Sun and Banyan to be compatible," he said. As a relatively small company, Dunkin' Donuts cannot command the attention of vendors to solve such software problems. "There is no reason it can't be resolved. If we were General Motors, it would be solved real quick."

Bennett said he is trying to throw what little weight he has into solving his problems with his vendors. Meanwhile, he has to deal with the scrutiny of the parent company, Allied.

"The parent company is all IBM. They don't know who Sun is. I'm the heretic," Bennett explained. He said he figures that he can escape being brought to IBM because the financial people at Allied appreciate his bottom-line costs, which he estimated at one-fourth to one-third of a mainframe shop.

Users welcome fault tolerance arrival

BY MICHAEL FITZGERALD
CW STAFF

Fault tolerance is coming to the desktop.

Analysts call the arrival of fault tolerance, long the domain of minicomputer makers such as Tandem Computers, Inc., a natural progression.

"It's not like this is a new technology; it's just something being ported to the desktop," said Richard Zwetchkenbaum, senior personal computer analyst at International Data Corp. in Framingham, Mass. "It's an accepted technology, it's been

tested on higher level platforms, and it has found a market. As everything becomes downsized and distributed, it's a natural progression."

William F. Ablondi Jr., an analyst at BIS Strategic Decisions in Norwell, Mass., agreed: "As companies adopt PC technology, in terms of applications it comes into play. It's not at all a wild goose chase [for vendors]."

Early entries in the market come from Advanced Logic Research, Inc. (ALR) and Texas Microsystems, Inc.

ALR recently announced its Powerpro/FT server and Busi-

nessveisa/FT desktop family. The Powerpro/FT is an upgradable multiprocessing box based on Intel Corp.'s 33-MHz 80386DX, 25-MHz I486SX and 33- or 50-MHz I486DX microprocessors. ALR bills the Powerpro/FT as a Compaq Computer Corp. Systempro-compatible machine.

Desktop disk arrays

The desktop Businessveisa/FTs are upgradable, offer users the ability to use a disk array controller from a desktop platform and are based on either a 33- or 50-MHz 486DX. It also offers a hardware disk array controller.

All the products contain the Extended Industry Standard Architecture bus.

Texas Microsystems, based in Houston, has built into its Fault Tolerant Systems Architecture (FTSA) line a custom version of Phoenix Technologies, Inc.'s BIOS that puts fault tolerance in the system software level, as well as adding hardware redundancy, including RAID Level 1 capability. The FTSA is built on the AT bus and will use Intel 386 and 486 chips with a socket for Weitek Corp. coprocessors.

Prices start at \$5,695 for the Powerpro/FT, \$4,995 for the Businessveisa/FT and \$6,500 for Texas Microsystems' FTSA.

Announcing SPF/2 Version 2.0—Now for DOS or OS/2

PC applications development using an ISPF-like environment just got better. We've added nearly 50 new features to SPF/2.

Now you can use SPF/2 with DOS as well as OS/2! All you need is DOS 3.1 or greater and an 80386 with 2MB of memory. SPF/2 is fully compatible with Windows 3.0 and PM.

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- Full transparent editing of EBCDIC or ASCII data by configuring the file profile.
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- CUT and PASTE using the PM Clipboard — transfer lines to/from other PM applications, even a 3270 session! In DOS, SPF/2 uses its own clipboard to CUT and PASTE.

- Enhanced multi-directory file selection lists with text search and list save/restore capability.

- Expanded printer setup which includes page size, margins, headers and footers, file-name, date, time and page number.

- Additional directory-list line commands such as move, copy, rename, exclude. Includes block versions of all line commands.

- Text highlighting for program source comments in several languages.

- Word jump and 3270 RESET to further 3270 compatibility with the mainframe.

- Enhanced macro support including an exit macro and macro access to PF key definitions (for OS/2 only).

- And over 30 more new features!

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PCs let debt collection get personal

BY KIM S. NASH
CW STAFF

The next time you miss a month on your Visa card or mail the Macy's payment late, you may hear from debt collectors with routines customized just for you.

To wring money from recession-thinned wallets, collectors at GE Capital Corp., the finance arm of General Electric Co., developed Payment, a personal computer-based software program that devises custom-made debt collection plans.

Collection agents can download cardholder credit and repayment histories from GE Capital's mainframe databases to 386-based PCs running Payment, which calculates the best method for getting each debtor to pay up.

Industry estimates put the retail consumer credit market at more than \$220 billion. GE Capital handles 300 private label credit cards — the largest third-party portfolio in the country, ahead of Citicorp and Sears Roebuck and Co. Some of its clients are R. H. Macy & Co., Montgomery Ward & Co., Apple Computer, Inc. and Mitsubishi Electric Co.

Because of varying demographics and

product line, each credit card account has different repayment traits, and so do the individual customers who carry those cards. Based on those statistics and data about the debt at hand, Payment figures out which debtors to muscle (daily phone calls at home and at work) and which to take the soft-sell approach (cheerful reminders in the mail).

The program "shows scientifically who responds to which tactics," statistician Bill Makuch said. He and Jeff Dodge, manager of credit and policy at GE Capital, led the four-year effort to develop the system.

In the two years it has used Payment, GE Capital has cut charge-offs "substantially," Makuch said. Charge-offs are the percentage of total outstanding credit card balances client companies are likely to write off as losses at tax time. Losses at the \$4 billion Montgomery Ward account have been cut \$20 million per year since 1989, when Payment was first used there, according to Makuch. GE Capital as a whole projects its loss avoidance at \$37 million to \$44 million for 1991 on its \$12 billion in worldwide credit balance for private label cards, he said.

To apply Payment, collection agents

download as many as 144 individual pieces of historical customer data from one of GE Capital's IBM 3090 and Enterprise System/9000 mainframes in Atlanta and Stamford, Conn., to 386-based PCs in the firm's nationwide collection centers.

Payment quantifies the data, including such factors as age, sex, income and repayment record, against current data such as amount owed and length of time delinquent. Payment then decides the most fruitful avenue for each situation.

The hard-line approach might get the company part of what it is owed, but if customers feel harassed, they are less likely to use that card again, Makuch said.

"We're learning to manage delinquency rather than just beat up on people," Makuch said.

In the 70's, everyone wanted an easy-to-use relational database. They settled on Oracle. But it was slow.

In the 80's, everyone wanted speed. Sybase promised speed. But only for short updates.

Now the 90's demand both — and a lot more. An RDBMS where high performance measurements go beyond the repetitive, short write benchmarks of OLTP. An RDBMS that is truly easy to use, and designed to meet today's increasing challenges. In the 90's, businesses need OLCP (On-Line Complex Processing) — a database concept that allows you to build more complex applications, perform more complex analyses, and use more complex data in heterogeneous environments.

Which brings us to the small print.

New drives boast high capacity

BY CHRISTOPHER LINDQUIST
CW STAFF

High capacity, fault tolerance and ease of replacement were key phrases in recent announcements from three hard disk drive vendors.

Hitachi America Ltd. said it will unveil a line of high-capacity 5¼-in. and 3½-in. drives at last week's Comdex/Fall '91 in Las Vegas. The DK514 series of 5¼-in. drives will have unformatted capacities of 3.7G and 2.6G bytes, while the DK315 3½-in. drives will have formatted capacities of 1.4G and 1.1G bytes. Hitachi stated that the drives have the highest capacities yet announced for the form factors.

Micropolis Corp. went the way of high storage and fault tolerance for Novell, Inc. Netware 386 environments through the use of redundant arrays of inexpensive disks, or RAID, technology. The Raidon Disk Array can contain anywhere from three to 28 disk modules for 680M to 47G bytes of available storage.

Pricing for the Raidon system starts at \$8,160 for three 340M-byte array modules and ranges to \$31,500 for three 1.75G-byte modules.

Upgrade modules are available in 340M- (\$2,720), 670M- (\$4,913), 1.03G- (\$6,867) and 1.75G-byte (\$10,500) increments.

Also for network users, Netframe Systems, Inc. announced Live-Drive, a drive subsystem that allows users to remove and replace hard drives without powering down a network server.

Using Live-Drive, a user can remove a drive from a Netframe server for repair or replacement without interrupting operation of the server.

The drives are scheduled to be available in November for a list price of \$7,995 for a 1.68G-byte capacity drive.

Before you settle on Oracle or Sybase for OLCP, read the small print.



Multi-Generational Database Architecture

No other database architecture gives you the performance you need in demanding multi-user OLCP environments. Multi-Generational Architecture results in the industry's fastest response in mixed read/write situations.

Real-Time Event Alerters

Instantly notify any application on your network when critical data changes — without the overhead of a polling loop, or the risk of acting on an uncommitted change.

INTERBASE	YES
ORACLE	NO
SYBASE	NO

INTERBASE	YES
ORACLE	NO
SYBASE	NO

IBM multimedia an alluring vision

CONTINUED FROM PAGE 37

The announcements featured a broad array of products and strategies for developing multimedia applications. Among them were the following:

- The IBM Personal System/2 Ultimedia Model M57 SLC. This is a specialized version of IBM's PS/2 Model 57SX, with a power management chip designed by IBM and compatible with Intel Corp.'s 80386 chip architecture. The M57 SLC also has IBM's Extended Graphics Array display controller; the M-Audio capture playback adapter card; a built-in compact disc/read-only memory drive, which will have CD with DOS 5.0; Windows; and an

audio front end that offers volume control, speaker jacks and a microphone jack built onto the front panel of the box. It is scheduled to be available in March 1992 for \$5,995.

- PS/2 Action Media II is the first board to use Intel's I750 video processor chip set. The boards do digital compression, are priced about 40% lower than the Action Media 750 boards and require only one board. Action Media II boards run under OS/2 1.3 and Windows 3.0 as well as DOS. The previous boards, introduced in early 1990, ran under DOS only.

The XT/AT-bus version of Action Me-

dia II, with its capture module, sells for about \$2,600, compared with \$4,600 for the current Action Media two-board set. The Micro Channel Architecture (MCA) bus version costs \$200 more. To run under DOS, the Action Media II DOS Library is required for an additional \$1,000. The MCA version is set to be available March 27, 1992; the AT-bus version on June 26, 1992.

- Multimedia Presentation Manager/2 and developer's tool kit. These are multimedia extensions for OS/2 2.0 for 32-bit multimedia application development. They conform with joint IBM and Microsoft Multimedia Programming Interface and Data Specifications announced in August. They are scheduled to be available in the first half of 1992.

- PS/2 TV is a fully integrated audio/video tuner that allows a desktop PC user to monitor and broadcast video signals. This is hooked up in similar fashion to a video cassette recorder.
- Two new Touchselect monitors. The 12-in. monitor costs \$670; the 19-in. monitor \$850. Scheduled availability is for March 27, 1992.
- Integrated multimedia kiosks.
- Microsoft Multimedia Extensions. Multimedia for Windows 3.0 is due Jan. 31, 1992.

IBM also announced a Multimedia Tools Series and released several developed applications, including Columbus and several Illuminated Books and Manuscripts. Aimed at the education market, each product costs \$2,857 and is due to ship June 26, 1992. IBM last week shipped a package aimed at the chronically unemployed, which will sell for \$4,500.

Since 80% of the decisions you make are based on dynamically changing complex events — not short data updates — only the OLCP database will do. Only InterBase delivers the technology you need to handle OLCP applications.

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Automatically Activated Two-Phase Commit

Eliminate data loss or duplication in distributed networks. Only an automatic two-phase commit ensures that all remote changes are synchronized, without pages of polling and verification code.

Modular, Sequenceable Triggers

Only triggers in the data dictionary ensure that business rules (integrity) are consistently enforced, regardless of the application. Modular triggers maximize programming productivity and reliability.

INTERBASE	YES
ORACLE	NO
SYBASE	NO

INTERBASE	YES
ORACLE	NO
SYBASE	NO

INTERBASE	YES
ORACLE	NO
SYBASE	NO

INTERBASE	YES
ORACLE	NO
SYBASE	NO

Savage

CONTINUED FROM PAGE 37

erating systems to license. If you go with The Santa Cruz Operation's (SCO) versions, you will have to license Desktop for Intel and Desktop for Mips. But seamless application progression from the sea to the sky? Forget it. You have to recompile applications between platforms.

If you love Microsoft, you'll fare better, but you won't get Unix applications that take advantage of the faster Mips platform. You can license DOS, Windows 3.0, OS/2 and New Technology (NT) from Microsoft. Applications that run on one will run on the rest — but DOS and Windows will run in emulation on the Mips platform, which takes away some of the speed users would buy it for.

OS/2? That is unlikely to last long. As soon as NT is available, Microsoft will "encourage" users (read: remove OS/2) to bolt to NT.

Microsoft figures users will not want to go outside the Microsoft environment and is building little connectivity into NT. SCO views users in heterogeneous environments and is including popular connectivity standards into Desktop.

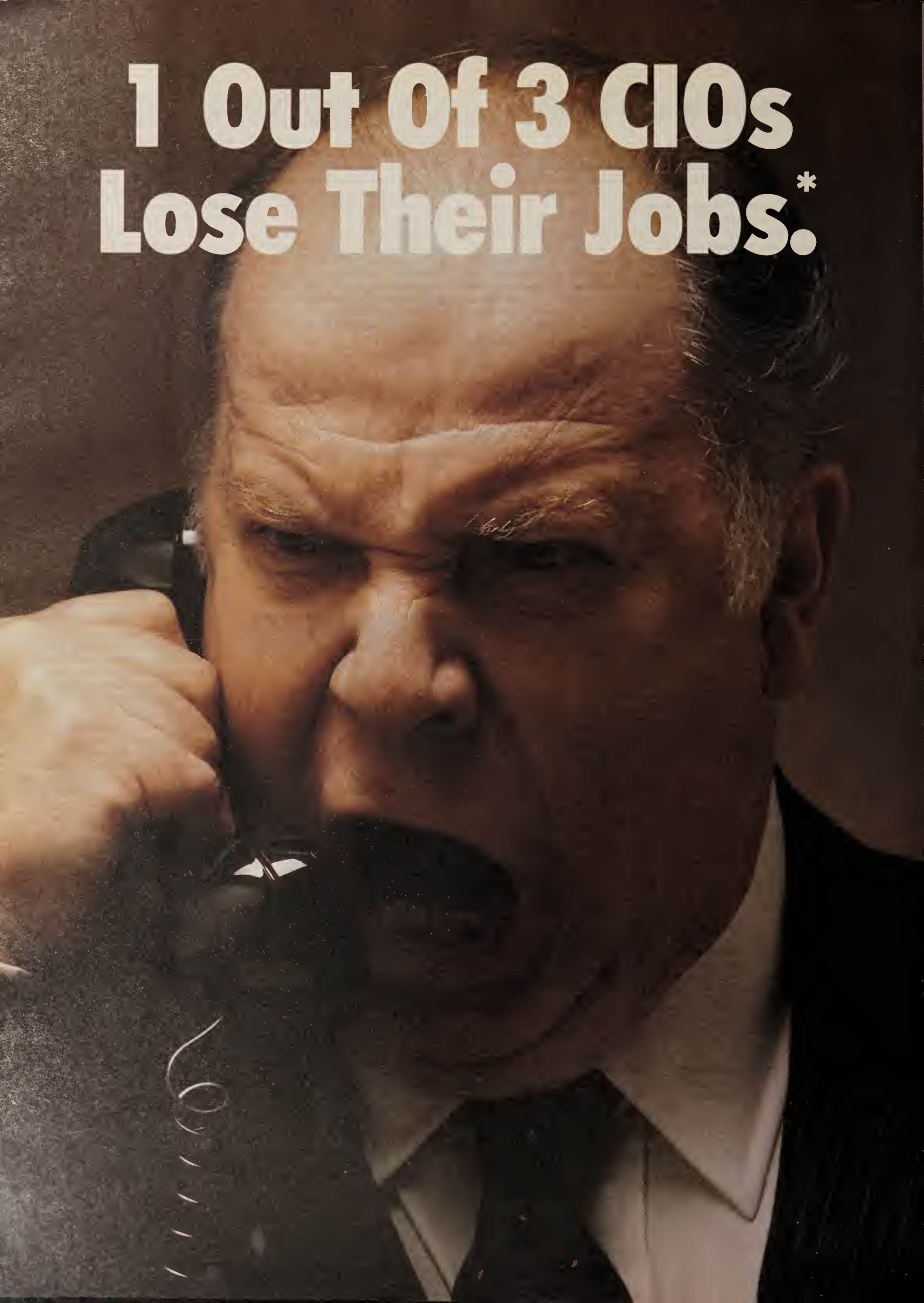
Neither SCO's nor Microsoft's graphical user interface is dazzling. NT looks like Windows and SCO's Desktop looks like Windows, only SCO insists that it is based on Motif. Compared with Unix-based Motif or Open Look, these interfaces appeared tacky in previews.

Once users get over the operating system choices, then there's the selection of hardware vendors. Each of the major vendors seems to have a different view of how ACE stuff will be used. DEC, for instance, pretty much sees itself as the be-all and end-all of computing needs. "Once users have our equipment, why would they want anything else?" a DEC official at one ACE gathering said. Silicon Graphics, on the other hand, hopes it will broaden its appeal beyond specialty graphics computers by being able to interoperate them with other platforms through the ACE initiative.

The ACE initiative will open what were once Intel channels of distribution to both Intel and Mips. On the up side, that could mean one-stop shopping. But that's it. The seamless blue of sea and sky is just a mirage.

Savage is a *Computerworld* West Coast senior correspondent.

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*Source: *Computerworld* article, February 1991



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Resolve: Power with ease but lacks features

Technology Analysis — A roundup of expert opinions about new products. Summaries written by freelance writer Suzanne Weixel.

Claris Corp.'s Resolve spreadsheet program for Apple Computer, Inc. Macintosh computers combines an accessible interface with a powerful scripting language.

Ease of use: Resolve lets even novices create complex worksheet models with ease. The interface is clean and uncluttered, but reviewers said it could be enhanced by a central horizontal tool palette for performing common spreadsheet functions.

Performance: Resolve requires System 6.0.2, 1M byte of random-access memory and 2M bytes of hard disk space, although it takes 5M bytes to install all of its files.

Output control: Resolve has an impressive list of chart types, including true three-dimensional color charts, surface charts and polar coordinate charts. It is easy to add color and drop-in graphics to a worksheet.

Analysis tools: Resolve is missing some built-in, high-end analysis features, but knowledgeable users can build pretty much any function they want with the scripting language.

Value: Resolve has a lot to offer spreadsheet users. Friendly on the surface, it makes power available to those who need it. It costs \$399.

Claris' Resolve

Reviews	Ease of use	Performance	Output	Analysis	Value	Overall
PC Week 8/12/91	Highly graphical	Extremely fast	Powerful charting	Lacks some esoteric features	Combines power and graphics	Outpaces rivals
Infoworld 7/29/91	Easy-to-use interface	Powerful	More chart types	Full-featured; matrix math	Competitive product	Lacks some high-end features
Mac Week 9/10/91	Good	Good	Impressive array of chart types	Good	Good	Much friendlier
Users						
Eric Graham, Spreadware	■ ■	■ ■	■ ■	■ ■	■ ■	Usable interface
James Felbab, Ameritech Services, Inc.	■ ■	■ ■	■ ■	■ ■	■ ■	Fast and flexible
Rolf Drommer, Harbinger Services	■ ■	■ ■	■ ■	■ ■	■ ■	System 7.0 support useful
Barry Margerum, Mitem Corp.	■ ■	■ ■	■ ■	■ ■	■ ■	Superior macros
Analysts						
Richard E. Meyeroff, Meyeroff Computer Consultants	■ ■	■ ■	■ ■	■ ■	■ ■	Highly versatile
Don Crabb, University of Chicago	■ ■	■ ■	■ ■	■ ■	■ ■	Nice charts; good System 7.0 support

Key: ■ ■ Very good ■ ■ Good ■ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment.

Vendor background information

Claris is a wholly owned subsidiary of Apple Computer, Inc. Founded in 1987, the company has more than 500 employees. A private company, Claris does not release financial information. The company's products include Macintosh software for spreadsheets, word processing, graphics, database management, project planning, CAD and electronic forms processing.

Claris responds

Dennis Ryan, product line manager

Ease of use: Common spreadsheet functions are readily accessible in Resolve.

Performance: We plan to provide a file format translator for Excel 3.0 in a future version.

Analysis tools: Resolve's script language is not intended to make up for missing capabilities. It lets you automate tasks and it extends the capabilities.

Excel for Macintosh has the tools but slow

Microsoft's Excel 3.0 for the Macintosh

Reviews	Ease of use	Performance	Output	Analysis	Value	Overall
Mac User 7/91	Easier than predecessors	Powerful, accessible	Enhanced charting, more polish	New tools boost power	Well worth the wait	Improved features
Mac Week 5/21/91	Average	Very good	Innovation returns	Very good	Adds all that was lacking	Powerhouse but lacks consistency
Macworld 9/91	Real Improvements	Slower at large-scale numerics	Missing some chart features	Useful new features	Nearly everything you could want	System 7.0-compatible
Users						
Eric Epstein, U.S. Sprint Communications Co.	■ ■	■ ■	■ ■	■ ■	■ ■	Better graphing
Jim Cunningham, US West	■ ■	■ ■	■ ■	■ ■	■ ■	Nice look and feel
Diane Achman, McDonald Douglas Space Systems Co.	■ ■	■ ■	■ ■	■ ■	■ ■	Enhanced graphics
Analysts						
Amy Wohl, Wohl Associates	■ ■	■ ■	■ ■	■ ■	NC	Need spreadsheet training
Steve Schwartz, Consultant	■ ■	■ ■	■ ■	■ ■	■ ■	Macro language incomprehensible
Richard E. Meyeroff, Meyeroff Computer Consultants	■ ■	■ ■	■ ■	■ ■	■ ■	Complete; not very flexible

Key: ■ ■ Very good ■ ■ Good ■ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment.

Vendor financial ratings

Analyst	Long-term stability	Short-term performance
Peter Rogers, Robertson, Stephen & Co.	■ ■	■ ■
W. Christopher Mortenson, Alex. Brown & Sons, Inc.	■ ■	■ ■

Redmond, Wash.-based Microsoft reported fiscal year ending September revenue of \$580.5 million, a 57% increase and profit of \$144 million, a 64% increase over 1990.

Microsoft responds

Michael Pinckney, product manager

Ease of use: Chances are we will make the Toolbar expandable and customizable in the future.

Performance: You can write 10,000-line applications in our macro language. We do hope to make it easier to use, but in the meantime, the macro recorder lets you learn as you work. We shipped before System 7.0 was available.

Version 3.0 of Microsoft Corp.'s Excel for Macintosh adds analytical features that power users will love. But reviewers said Excel is still playing catch-up in such areas as graphics support and ease of use — incorporating features that should have been included long ago.

Ease of use: Excel 3.0 sports a new look that includes the Toolbar, a row of icons for performing the most important spreadsheet functions.

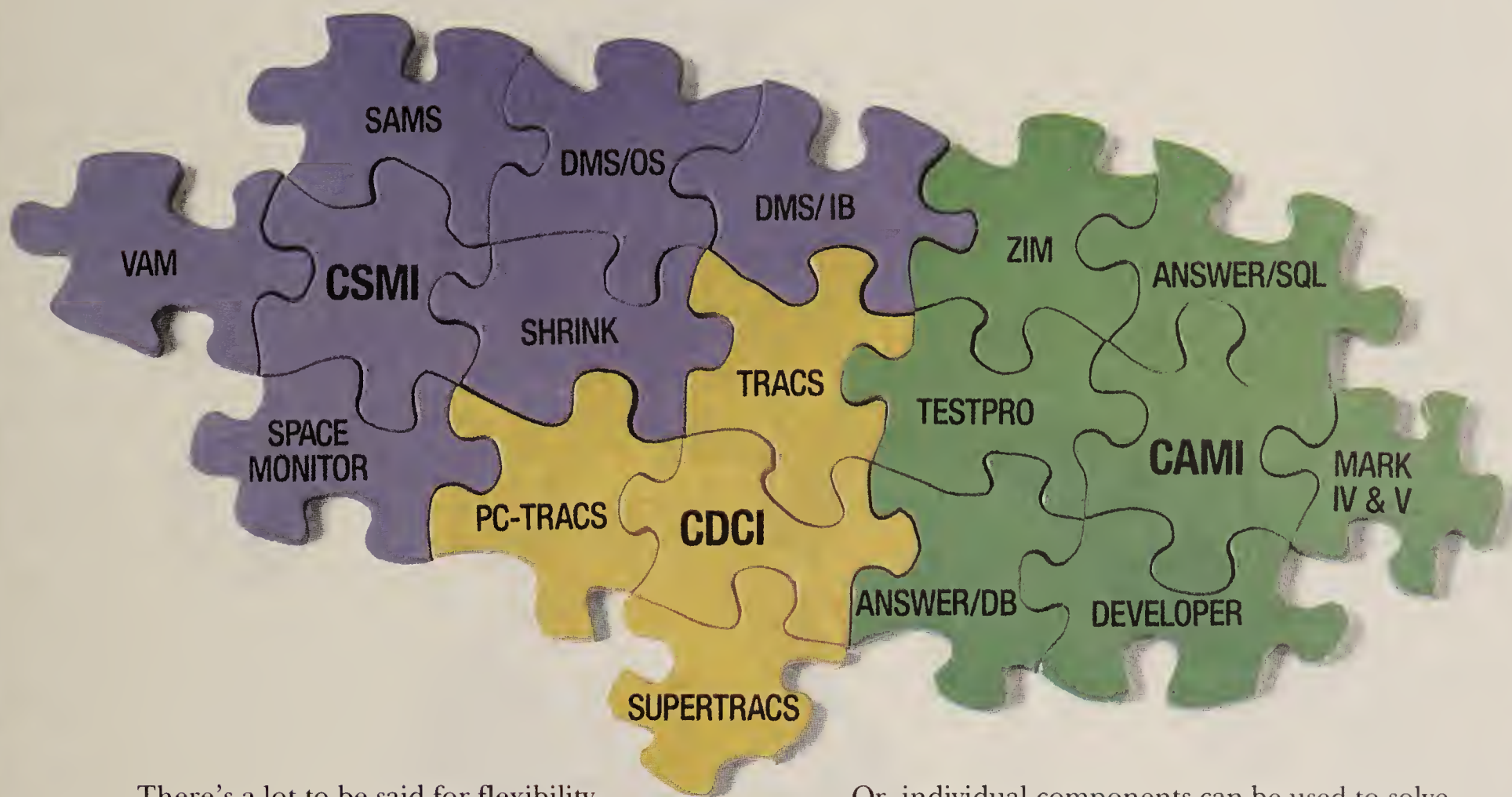
Performance: Excel 3.0 requires a minimum of System 6.0.2, 1M byte of random-access memory and more than 4M bytes of hard disk space. Support for System 7.0 does not always conform to standards. Reviewers say the programming environment comes up short, and overall speed seems slower.

Output controls: There are 24 new 3-D chart options, and users can finally combine text, worksheets and multiple charts on a single page.

Analysis tools: Excel 3.0 offers just about every analytical tool users could want. Novices will appreciate Autosum for automatically filling in ranges of numbers. Sophisticated users will like the what-if goal seeking features of Solver, which shows how various cells would have to be modified to meet a predefined goal.

Value: Version 3.0 raises the Macintosh spreadsheet standard to new heights. It costs \$495.

FINALLY, AN ENTERPRISE-WIDE STRATEGY YOU CAN IMPLEMENT ALL AT ONCE OR ONE PIECE AT A TIME.



There's a lot to be said for flexibility.
In this case, the word "Sterling" comes to mind.
Because whether you're looking to solve one
small systems problem, or searching for a way to
solve your enterprise-wide puzzle, you'll find Sterling
Software can help.

CAMI Streamlines Application Development.
Our Corporate Applications Management Initiative
encompasses advanced CASE, 4GL/RDBMS, reposi-
tory, automated testing and client/server technolo-
gies into one, integrated life cycle environment.

CAMI's highly productive. It's compliant with
both AD/Cycle and SAA. It embraces mainframe
platforms, DOS, OS/2, UNIX and VMS. Simply put,
CAMI is the future of enterprise-wide applications
management.

And it's here right now.

CSMI Automates Storage Management. Our
Corporate Storage Management Initiative allows your
staff to manage more DASD, more efficiently.

When implemented as a whole, CSMI delivers
on the promise of intelligent, automated, system-
managed storage.

Or, individual components can be used to solve
particular problems, like backup, reporting, alloca-
tion management, access control, disaster recovery,
data compression and others.

And—unlike other "solutions"—CSMI is avail-
able today.

CDCI Communicates With Everyone. Our
Corporate Data Communications Initiative offers fea-
tures like complete transparency, reliable automa-
tion, and multi-protocol, multi-platform support for
data transmission.

So no matter what protocol—BISYNCH,
ASYNCH, SNA, X.25 or TCP/IP, to name but a
few—CDCI can handle it. And across almost any cor-
porate hardware/software environment in existence.

**Which pretty well sums up our entire Enterprise-
Wide Strategy.** We put the pieces together. So if you
want to improve the productivity of one small part of
your system, or realize enterprise-wide productivity
gains now and tomorrow, there's one thing you
should know.

Our name.



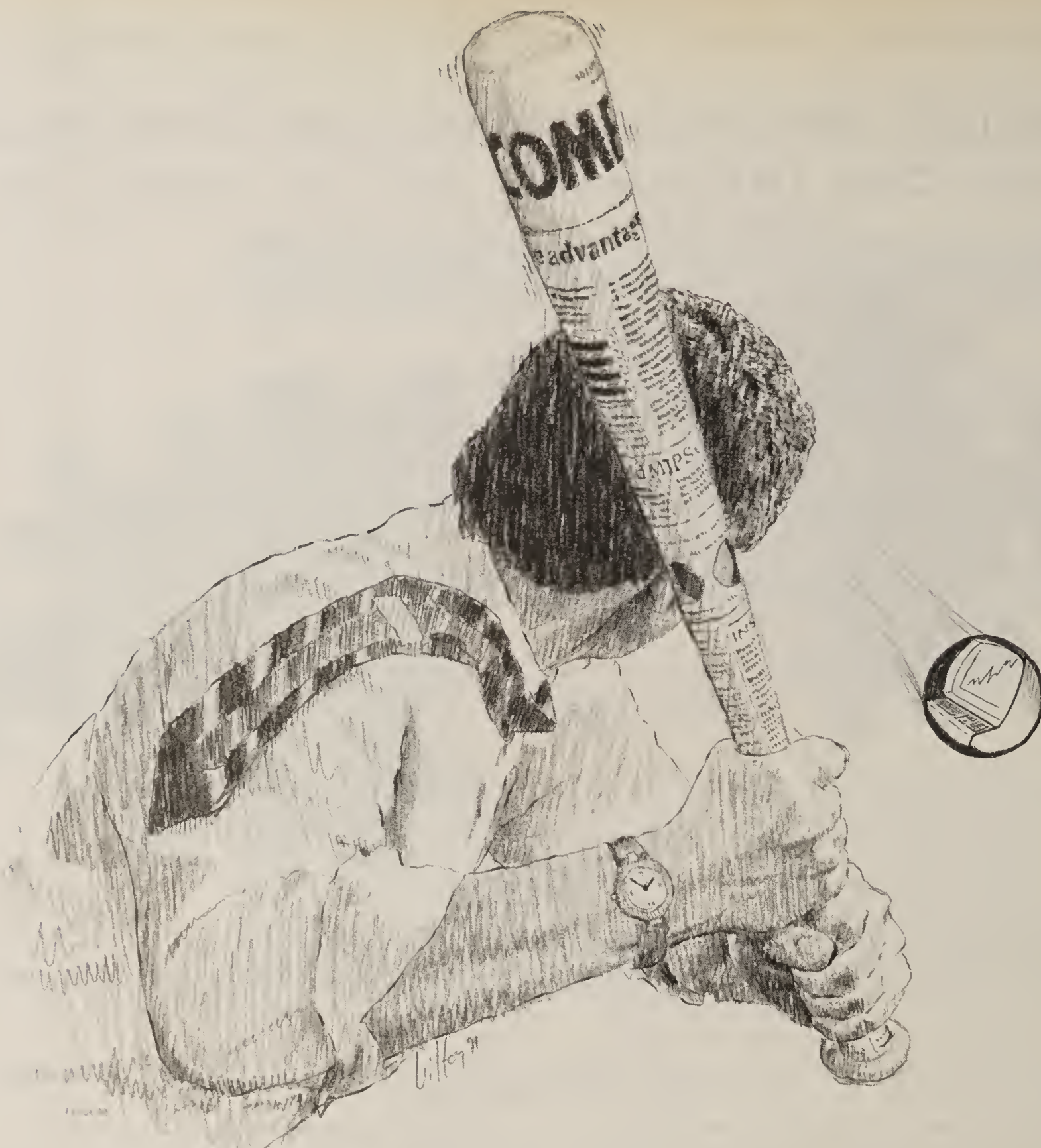
**STERLING
SOFTWARE**

THE FUTURE IS STERLING.

System Software Group Headquarters, 5900 Canoga Avenue, P.O. Box 4237, Woodland Hills, CA 91367-4237, Phone: (818) 716-1616.

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Software Labs Division: (714) 889-2663 Systems Software Marketing Division: (916) 635-5535

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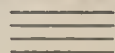
Plus you'll get our special bonus publication, *The Premier 100*, an annual profile of the top companies using information systems technology.

According to a study conducted by the Adams Company, an independent research firm, *Computerworld* is the best-read publication in the industry — especially among heavy hitters.

So don't get left off your company's starting line-up. Use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Because out there in the world of information systems, it's a whole new ballgame.

COMPUTERWORLD



Announcing
the new
IBM LaserPrinters.
Suddenly, other printers
are a few pages
behind.

With 45% faster graphics, the keeps you way ahead

*In the time it takes
the HP LaserJet III to print
this much...*

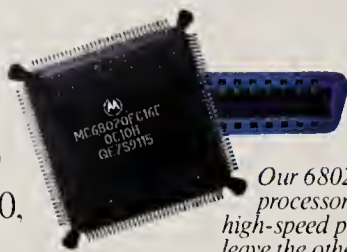


*Faster graphics and
text mean more
work, less wait.*



As you can see, this is a printer with legs.

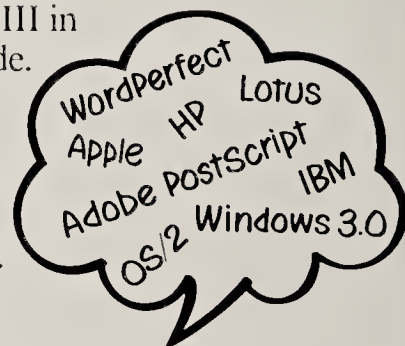
In fact, for the new IBM® LaserPrinter 10, 45% faster graphics is just a warmup. Shift into optional PostScript® mode, and the LaserPrinter 10 is a full two-and-a-half times as fast



*Our 68020
processor and
high-speed ports
leave the other
guys in the dust.*

as the LaserJet III in PostScript mode. And those are just averages. The more complex your page, the more time you save.

At the heart of the new LaserPrinter 10, a Motorola 68020 processor makes short work of tough graphics.



*The new LaserPrinters
definitely speak your
language.*

THE NEW IBM LASER PR

new IBM LaserPrinter 10 of the other guy.



*...the IBM LaserPrinter 10
gives you the whole picture.*

A 10-page-per-minute print engine boosts speed further, so even plain text prints 25% faster than the LaserJet® III. High speed ports accept data up to 15 times faster, too, to unjam LANs and keep people working, not waiting.

If you're wondering how all this speed fits into your system, don't. Every new IBM LaserPrinter has three built-in data streams, *including* built-in HP LaserJet II emulation. There are drivers from the



*The IBM LaserPrinter 10,
one of four
new LaserPrinters.*

major software makers, and LaserJet III emulation and Adobe® PostScript are optional. So LaserPrinters save you not just time, but headaches.

There's a whole family of new IBM LaserPrinters, designed to outrun the competition in print quality, paper handling, and more. So keep your eyes on the next few pages. You'll see how the new IBM LaserPrinters put you precisely where you want to be: ahead.

Graphics speed comparisons based on captured, compressed image data files. PostScript files sourced from Microsoft® Soft Print® test case, running files captured from output of application drivers.

PRINTERS. PAGES AHEAD.

At 600 x 600 dpi, there does wonders for any

*HP LaserJet III
with PostScript option:
300 x 300 dpi, max.*



Courier
Courier Oblique
Courier Bold
Courier Bold Oblique
Times New Roman
Times New Roman Italic
Times New Roman Bold
Times New Roman Bold Italic
Helvetica
Helvetica Italic
Helvetica Bold
Helvetica Bold Italic
Helvetica Narrow
Helvetica Narrow Italic
Helvetica Narrow Bold
Helvetica Narrow Bold Italic

Times
Times Bold
Times Italic
Times Bold Italic
Univers
Univers Bold
Univers Italic
Univers Bold Italic

*Sixteen scalable fonts, built in—
twice as many as an
HP LaserJet. And our fonts are
Type-1. Theirs aren't.*

There's no end to the ways the new IBM LaserPrinters can make a body look good.

For starters, there's an Adobe PostScript option that delivers a true 600 x 600 dots per inch. It gives you up to *four times* the resolution of PostScript on any HP LaserJet. Camera-ready output, on your desktop, for thousands of dollars less than ever before.

But the eye-catching advantages of the new IBM LaserPrinters

LaserJet



IBM

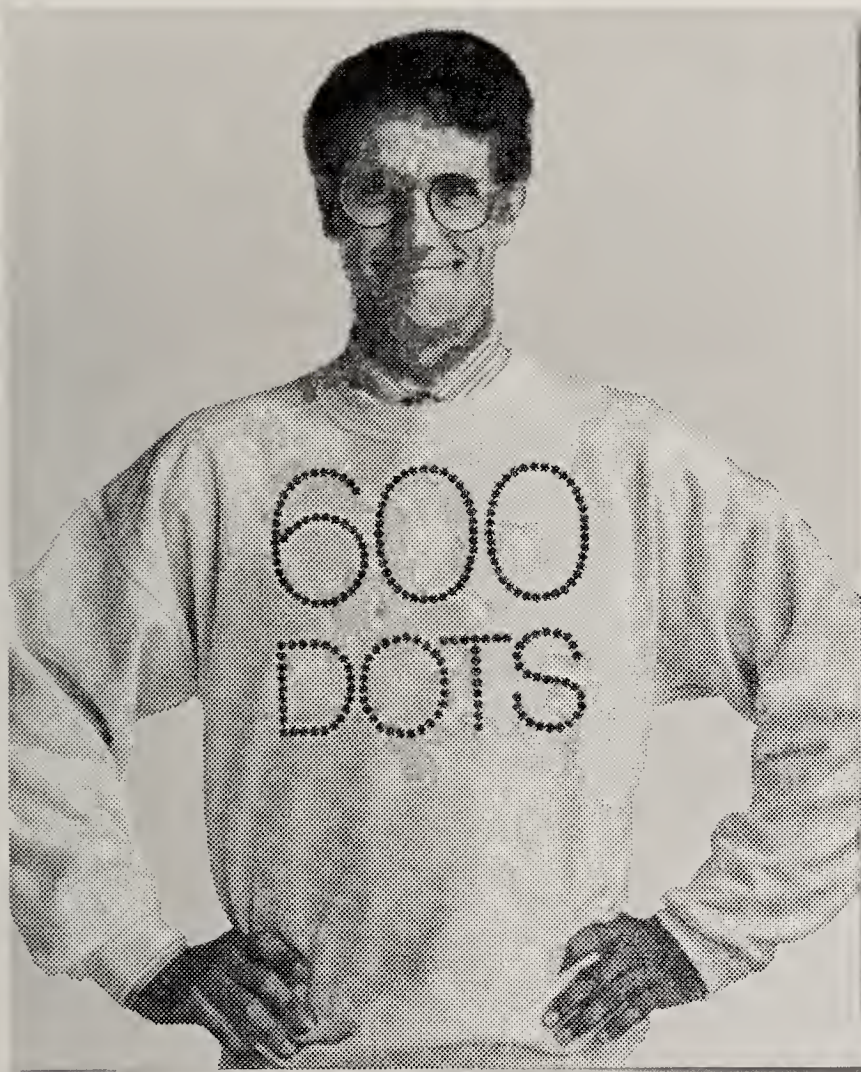


HP LaserJet jump-gap toner system vs. our contact-transfer. A clean win for the IBM LaserPrinter. (10x enlargement)

300 x 300 dpi PostScript optional on all LaserPrinter models; requires total of 2MB memory. Models 6, 10 and 10L upgradable to 600 x 600 dpi PostScript; requires total of 5MB memory. Motorola and the Motorola logo are registered trademarks of Motorola, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Windows 3.0 is a registered trademark of Microsoft Corporation. Lotus is a registered trademark of Lotus Development Corporation.

THE NEW IBM LASERPR

new IBM LaserPrinter image. Especially yours.



*IBM LaserPrinter
with PostScript option: 600 x 600 dpi—
up to four times the resolution.*

aren't reserved just for PostScript users.

Sixteen built-in scalable fonts are standard equipment—twice as many as the LaserJet III. They're Type-1 fonts with Adobe scaling technology, online and always ready, without waiting for downloads.

*LaserJet
RET* *IBM
PQET*

RR

*Can't see the difference?
No wonder. Our PQET
enhancement is
the equal of anything
in the industry.*

Also standard on every new LaserPrinter: crisper type and graphics than ever, thanks to sophisticated new Print Quality



*The new IBM
LaserPrinters: the
leading edge, made
sharper.*

Enhancement Technology (PQET). There's more precise toner transfer than any LaserJet, and finer line weights. And fast, easy control-panel settings no LaserJet offers, for light/normal/dark print, and smooth or rough paper settings.

Right from page one, the new IBM LaserPrinters make everything from simple correspondence to slick desktop publishing look crisp, clean, and cutting-edge.

Which makes you look extraordinarily sharp too.

Adobe and PostScript are registered trademarks of Adobe Systems Inc. HP and LaserJet are registered trademarks of Hewlett-Packard Company. Times New Roman is a trademark of Monotype Corp., PLC. Helvetica and Times are trademarks of Linotype-Hell AG and/or its subsidiaries. OS/2 is a registered trademark of IBM Corp. IBM is a registered trademark of IBM Corp. in the United States and/or other countries and is used under license.

INTER. PAGES AHEAD.

With 3½ times the paper capacity,
lets you relax.

*HP LaserJet III:
200-sheet limit; second tray
or larger tray options
not available.*



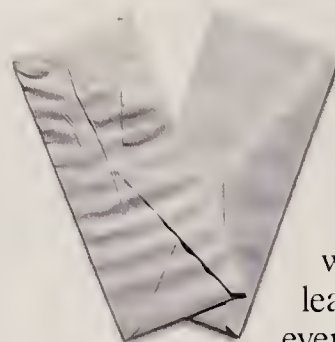
*HP LaserJet III:
sorry, one tray at a time.*



*IBM LaserPrinter:
up to three
trays at once,
for automatic
collating.*

For an antidote to everyday office stress,
try the superb paper-handling options of the new
IBM LaserPrinters.

Most models can use three paper trays at once,
automatically. So you can print and collate letterhead,
second sheets and envelopes, without swapping trays.



*Envelope Conditioning on
Models 10 and 10L fights
unsightly wrinkles.*

Need expertise
with envelopes? No
leading laser printer
even comes close to the

IBM LaserPrinters.
They adjust print
weight automati-
cally when an envelope is fed in. Our
optional 75-envelope feeder holds five
times as many as the LaserJet III tray.



*Optional trays smoothly
handle card stock, labels,
overheads.*

T H E N E W I B M L A S E R P R

the new IBM LaserPrinter not reload.



*IBM LaserPrinter:
700 pages without
reloading, using
optional 500-sheet
second tray.*



*Zero-footprint, 500-sheet
second tray is standard
on the Model 10L, optional
on Models 6 and 10.*

And on the LaserPrinter 10 and 10L, our exclusive Envelope Conditioning fights wrinkling.

There's a special optional tray for heavy card stocks and labels, and a front exit to keep them flat.

And along with all this efficiency, there's economy. "Smart" paper trays adjust to multiple paper sizes, unlike LaserJet trays. Trays are interchangeable among

LaserPrinter models, again unlike the LaserJet.

One more economics lesson: LaserPrinter toner cartridges give you significantly more pages than any LaserJet cartridge—up to twice as many pages between replacements.

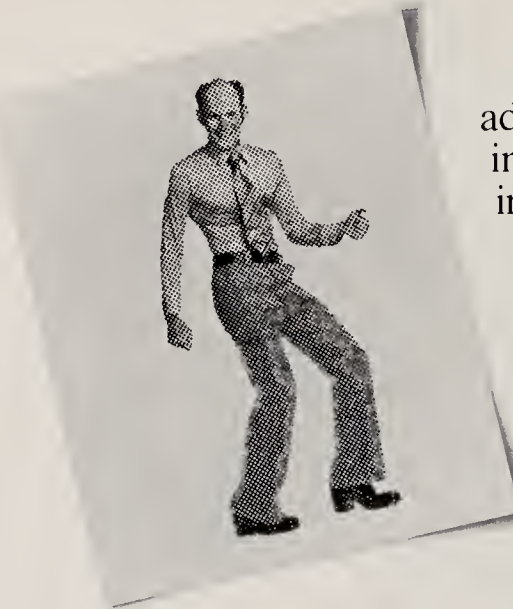
In short, the new IBM LaserPrinters give you economy and paper handling the competition can't touch. With this kind of work-hungry, cost-conscious office help, you can actually afford to relax.

500-sheet tray and front exit not available on Model 5E.

I N T E R S . P A G E S A H E A D .

The LaserPrinter you buy today won't be out of date tomorrow.

No matter how quickly your printing needs change, the new IBM LaserPrinters can change with them. Any six-page-per-minute machine can be easily upgraded to a full 10 pages per minute. Auxiliary trays can be added any time, and moved quickly from machine to machine, or from model to model. Adobe PostScript upgrades and

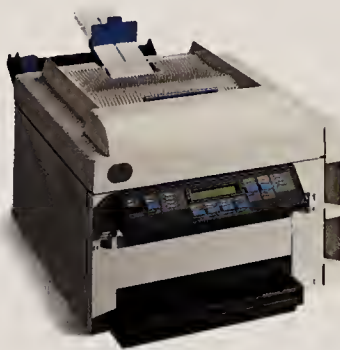


additional memory are easy to install yourself, in minutes, and are interchangeable among LaserPrinter models. And one toner cartridge design fits every LaserPrinter.

Modular design means IBM LaserPrinters are uniquely qualified to deal with the business world's one certainty: uncertainty.



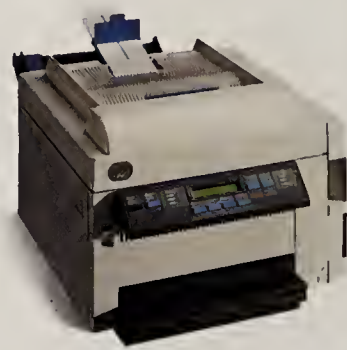
LaserPrinter 10L—10 ppm, Motorola 68020 16.7 MHz, 700-sheet input, 250-sheet output, Envelope Conditioning, automatic emulation switching. \$2995 suggested retail. Optional: 75-envelope tray, Adobe PostScript 600 x 600 dpi, HP PCL5 emulation.



LaserPrinter 10—10 ppm, Motorola 68020 16.7 MHz, 200-sheet input, 100-sheet output, Envelope Conditioning. \$2395 suggested retail. Optional: 500-sheet paper tray, 75-envelope tray, Adobe PostScript 600 x 600 dpi, HP PCL5 emulation.



LaserPrinter 6—6 ppm, 200-sheet input, 100-sheet output. \$1895 suggested retail. Optional: upgrade to 10 ppm, 500-sheet paper tray, 75-envelope tray, Adobe PostScript 600 x 600 dpi, HP PCL5 emulation.



LaserPrinter SE—5 ppm, 200-sheet input, 100-sheet output. \$1595 suggested retail. Optional: 75-envelope tray, Adobe PostScript 300 x 300 dpi, HP PCL5 emulation.

LaserPrinters and LANs.

Printers this productive deserve to be shared, and a host of networking options makes it easy. For Ethernet™ or Token-Ring LANs, there's the IBM 4033 LAN connection for OS/2® and AIX® users. For Macintosh users, there's the IBM LaserPrinter

Option for AppleTalk® Networks, and for Novell® NetWare® environments, the NetPort® print server from Intel®. Network-ability is one more way the new IBM LaserPrinters put you ahead, and keep you there.



To learn more about the family of new IBM LaserPrinters, call for your nearest dealer:
1 800 IBM-2468, ext. 804. In Canada, call 1 800 465-1234.

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Manufacturer and distributor of
IBM LaserPrinters.

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THE NEW IBM LASERPRINTERS.

Kiwi marketers acquire taste for Unix

ON SITE

BY SALLY CUSACK
CW STAFF

AUCKLAND, New Zealand — The Kiwi Fruit Marketing Board, in its move from proprietary to open systems, said guaranteed uptime was a prime criterion in choosing a hardware vendor for the new systems architecture.

The Kiwi board buys the entire New Zealand crop of kiwi fruit for distribution and sale in 42 countries worldwide. The organization is moving from a Data General Corp. MV minicomputer environment to DG's Unix-based Aviion server platform.

While the board evaluated several other platforms, including IBM's RISC System/6000, a key reason for selecting Aviion was DG's offering in redundant arrays of inexpensive disk

(RAID) technology — the High-Availability Disk Array (HADA) subsystem.

"We have a bar-coded record of every box of kiwi fruit, which we track from grower to market," said Deen Hall, general manager of finance for the board. He added that this tracking process is crucial to quality management procedures. It allows service contractors in the transportation, shipping and cold storage industries to provide data directly into the board's database software.

"A big part of our requirement is to have real-time, on-line information as well as a communications environment that allows us to meet several objectives," Hall said.

"We have offices in five regional locations, and people must be able to log on at whatever office they happen to be in," he added.

Hall also said the company felt that the Aviion systems offered the best price/performance currently on the market. The board has purchased \$1.5 million worth of the hardware, software

a reduced instruction set computing-based quad-processor that will be used for the marketing and distribution functions.

The company plans to be using the full RAID 5 technology capabilities of the HADA subsystem within the next six weeks.



Kiwi Marketing Board tracks the fruit on DG's Aviion Unix-based systems

Large network

More than 300 personal computer end users will be connected to the system before all is said and done. The board has standardized on Intel Corp. 80386-based platforms and will also be adding I486 boxes over the next several years.

Hall said that while the migration from DG's minicomputer platforms to the Aviions has led the information systems staff down a number of one-way

streets, they have now determined a single way to proceed.

"It is not particularly straightforward, but it is manageable," Hall said.

The DG MV systems are running Cobol and Cognos, Inc.'s Powerhouse programs. The board has elected to use the Informix Software, Inc. Informix database management system on the Aviions.

The calls between the different software platforms require a background update file process before the Powerhouse applications can be run on the Aviions, Hall said.

All in all, board members are pleased with their selection. The power and the price of the Aviions, combined with the redundant power supply features of the HADA subsystem, offer the company what it needs to move toward its future goals, Hall said.

The board has an annual turnover of almost \$400 million and expects the Kiwi market to grow by 50% over the next five years.

NEW AT COMDEX

Software utilities

Distinct Corp. announced availability of an enhanced version of Distinct Back-Up for Microsoft Corp.'s Windows 3.0.

Version 2.4 offers a push-button menu system, improved data-compression capability and a DOS-based restore program. It also provides password-based security for Windows.

The product costs \$129.
Distinct
14082 Loma Rio Drive
Saratoga, Calif. 95070
(408) 741-0781

Compucom Corp. demonstrated its Remote Pro low-cost, remote-control software for personal computers.

Remote Pro (\$59) users can dial into a remote PC and exchange files or run applications.
Compucom
1180-J Miraloma Way
Sunnyvale, Calif. 94086
(408) 732-4500

Systems

Newquest Technologies, Inc. unveiled a handheld computer named the Academy.

The system employs five additional keys called Microwriter keys that allow users to increase input speed. The Academy is priced at \$599. It includes 128K bytes of memory, a serial cable and a software interface to the company's Ascend personal information management software.

The company also showed Version 4.0 of Ascend for Microsoft Corp.'s Windows environment and a version for pen-based computing. Ascend 4.0 (\$249 in-

cluding a time management cassette) offers new client-tracking features and improved network support. Ascend for Pens costs \$299.

Newquest Technologies
2550 S. Decker Lake Blvd.
Salt Lake City, Utah 84119
(801) 975-9992

Zenith Data Systems introduced the Z-486SX/25E, a personal computer based on the Extended Industry Standard Architecture bus.

The system includes a Texas Instruments, Inc. Graphics Architecture video card for accel-



erated graphics performance. It also offers 4M bytes of memory and includes Microsoft Corp.'s Windows 3.0 preinstalled on the hard drive.

A model with a 200M-byte hard drive costs \$6,199.
Zenith Data Systems
2150 E. Lake Cook Road
Buffalo Grove, Ill. 60089
(708) 699-4800

Micronics Computers, Inc. unveiled the Mport 433, a 14.9-pound portable computer based on the Intel Corp. 33-MHz I486 processor.

The AC-powered unit includes 4M bytes of random-access memory and a 16-bit expansion slot. It is priced at \$5,995 with a 120M-byte hard drive.

The company also announced a plug-and-play projection panel for business presentations. The Mpression weighs 3 pounds and can be placed on an overhead projector to display color and gray-scale images. The Mpres-

sion panel costs \$995.
Micronics Computers
232 E. Warren Ave.
Fremont, Calif. 94539
(415) 651-2300

Software applications packages

Syspro Impact Software, Inc. announced its Impact Award 2.0.

Impact Award is a complete accounting software system including General Ledger, Payroll, Cash Ledger, Estimating and other modules. The new version features improved performance, hot keys and on-the-fly conversions to accounting and manufacturing terminologies and foreign languages.

The product is written in Cobol and is available for DOS and Unix systems. Pricing starts at \$600 per module for single-user DOS licensing.

Syspro Impact Software
Suite 165
1801 E. Edinger Ave.
Santa Ana, Calif. 92705
(714) 541-0651

Tool Technology Publishing announced Wintools 1.0, an object-oriented file system and workspace customizing tool.

Wintools features drag-and-drop file management and advanced icon handling, the company reported. It includes Image Librarian, a utility program for managing icons and bit maps. It also offers up to 16 customizable virtual desktop screens and a number of security options.

The product costs \$149.
Tool Technology Publishing
Suite 107
1125 A St.
San Rafael, Calif. 94901
(415) 459-3700

Eclipse Technologies, Inc. demonstrated Madison Ave., a software package that, in conjunction with the Ad Lib, Inc. Gold Stereo Sound Adapter, creates presentations with voice and music effects.

Madison Ave. uses an object-oriented graphical interface and captures screens from graphics and business applications for use in presentations.

It is priced at \$119.

Eclipse Technologies
Suite 125
1221 W. Campbell Road
Richardson, Texas 75080
(214) 238-9944

Peripherals

Toshiba America Information Systems, Inc. introduced an 8 page/min. laser printer with Hewlett-Packard Co. PCL 5 and Adobe Systems, Inc. Postscript-compatible emulations.

The GX200 is based on a reduced instruction set computing processor and also offers resident IBM and Epson America, Inc. emulations. The printer includes 1M byte of memory, expandable to 5M bytes. The Postscript-compatible emulation requires 2M bytes.

The GX200 is priced at \$2,199.

Toshiba America Information Systems
Electronic Imaging Division
9740 Irvine Blvd.
Irvine, Calif. 92713
(714) 583-3000

STB Systems, Inc. demonstrated new products, including the PC-TV, a \$349 adapter for displaying live video on a computer monitor.

The PC-TV connects to a Super VGA adapter and a video cassette recorder and includes soft-

ware for running under DOS or the Microsoft Corp. Windows environment.

The company also displayed the Wind/X GUI Accelerator, a \$499 coprocessor board for improving the performance of graphical user interfaces.

STB Systems
Suite 210
1651 N. Glenville
Richardson, Texas 75081
(214) 234-8750

Relisys introduced the RE-9515 14-in. analog color monitor.

The noninterlaced monitor offers three selectable resolutions up to 1,024 by 768 pixels. Dot pitch is 0.28mm, and a non-glare screen is included.

The RE-9515 is priced at \$725.

Relisys
320 S. Milpitas Blvd.
Milpitas, Calif. 95035
(408) 945-9000

Nanao USA Corp. previewed a line of personal computer monitors including two flat-face displays.

The Flexscan F750I (\$3,499) is a 21-in., 0.31mm dot pitch color monitor with 1,280- by 1,024-pixel resolution. It offers refresh rates above 70 MHz and a flat display surface intended for use with graphical applications that require minimal image distortion.

The F550I (\$1,899) offers the same resolution in a 17-in. monitor with a 0.28mm dot pitch.

Both displays include a micro-processor for intelligent image control according to user preferences.

Nanao USA
23535 Telo Ave.
Torrance, Calif. 90505
(213) 325-5202

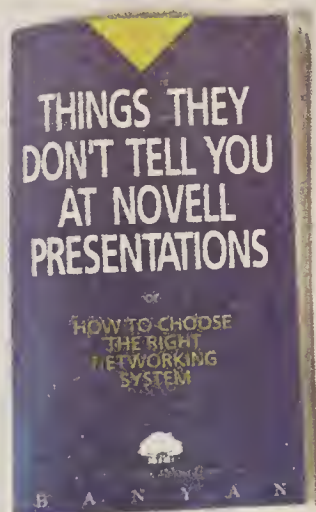
Nightmare Scenario #1

THE UNDETECTED TIME BOMB.

The biggest networking disasters always start small.

The problems tend to begin when you need to grow.

Suddenly, the computer network that worked so well doesn't seem to work at all.



Send for this free booklet full of hard, comparative information.

You have to hire more network administrators. Spend more money. Retrain. Reconfigure.

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NETWORKING

COMMENTARY

Joanie M. Wexler

WAN word woes



Funny how an industry striving to render networking "transparent," "seamless" and "open" can manage to create a wide-area environment so cluttered with competing technologies and redundant terminology that paralysis by analysis threatens a whole population of networking decision-makers.

To say that telecommunications managers have their work cut out for them is like noting that Dan Quayle has an image problem. WAN D-day is approaching, and managers will likely lose a hair or two sorting out the subtle technical and semantic differences among frame relay, cell relay, SMDS, ISDN, T3, ATM, STM and Sonet.

Yet that must be their mission if they are to choose the right technologies for their applications.

Recent trade shows have revealed much user confusion and naivete concerning these technologies. One attendee at the Interop '91 show summed it up: "There are too many terms being bandied about. It's not clear to me how they all differ."

The user made the comment immediately after he attended a detailed presentation by Bellcore — the local Bell telephone companies' "lab" — outlining the differences among the technologies and RBOC rollout schedules. Apparently, the messages aren't hitting home.

Continued on page 48

Users frown at IBM LAN plan

BY ELISABETH HORWITT
CW STAFF

A number of companies are balking at IBM's apparent insistence that they use two separate workstation products to oversee their local-area network installations.

Under IBM's strategy, those users would need both the existing LAN Network Manager for Token Ring LANs and bridges and the AIX System/6000 workstation, which IBM is now developing with Hewlett-Packard Co., to handle Ethernet LANs, bridges and routers via the Simple Network Management Protocol (SNMP).

IBM's OS/2-based LAN Net-

work Manager was originally designed to troubleshoot and monitor IBM's Token Ring LANs and bridges, using IBM Systems Network Architecture (SNA) protocols to interact with LAN devices. However, IBM has effectively made LAN Network

Manager a multivendor system by equipping it with High Level Manager (HLM), an Open Systems Interconnect (OSI)-based protocol that the vendor jointly developed with 3Com Corp. If IBM has its way, HLM will become an industry standard sup-

What IBM says:

- The OS/2-based LAN Network Manager can handle a multivendor network through with OSI-based High Level Manager.
- The upcoming AIX-based network management workstation will handle any LAN or connectivity device supporting SNMP.

What users say:

- They have already implemented LAN Network Manager and want to merge SNMP capabilities with it.

ported by a wide variety of LAN hardware vendors. However, solid support for the standard has yet to coalesce.

Meanwhile, IBM is getting set to officially announce an AIX, RISC System/6000-based system that will manage any LAN or interconnectivity device that supports SNMP, an HP spokesman confirmed. And the ranks of SNMP supporters are growing by the week.

IBM is presenting its two LAN management workstations as complementary options. To firms such as The Travelers Corp., however, they look more like a dilemma. The firm already uses LAN Network Manager to manage its IBM LANs, bridges and media access units, said Robin Layland, the insurance

Continued on page 53

LAN management gets attention at Network

BY ELISABETH HORWITT
CW STAFF

DALLAS — With network management standards still a long way from maturity and leading network vendors' management products a long way from full functionality, users are turning increasingly to third-party local-area network management products. At this month's Network '91 show, there were plenty of products to choose from.

Network management has become a hot issue for information systems managers struggling to integrate a multivendor enterprise networking environment, said Marty Palka, an analyst at San Jose, Calif., research firm Dataquest, Inc. "First users wanted multivendor connectivity; then connectivity with high performance and interactive communications [between dif-

ferent types of systems]; then network management."

"Multivendor integration is costly, not just because of the interoperability issues but because of administration and management — management is a major challenge," said Elaine Bond, chief technology officer at The Chase Manhattan Bank NA and president of the Open User Recommended Solutions user group. "The third-party stuff is good, but it is custom-crafted; we want uniformity."

The common denominator
What users really want is a common network management system for all of their network pieces, Palka said.

However, right now the LAN management industry is extremely segmented, forcing users to craft their management systems from a collection of

products from their primary vendor and third parties.

Among the pieces announced at Network were the following:

- Emerald Systems Corp. in San Diego announced Xpress Librarian, said to be the first LAN data management and backup system based on Microsoft Corp.'s Windows. The system reportedly allows network administrators to do disk grooming, file aging and archiving as well as backup and restore of files across a Novell, Inc. LAN.
- Horizons Technology, Inc. in San Diego announced Version 2.0 of its LAN Auditor program for automatically auditing and tracking operating configurations on networked personal computers. The new edition supports Windows 3.0 and adds support of Banyan Systems, Inc.'s Vines and Microsoft's LAN Manager to the older version's Netware support.
- Triticom in Eden Prairie, Minn., announced the Landecoder Series, which was designed to be a low-cost diagnostic and management product for Netware. The Landecoder runs

on existing Intel Corp. 80286 or higher DOS machines and is said to capture and decode Novell IPX and SPX protocols and the Novell Netware Core Protocol on either a Token Ring (\$1,195) or Ethernet LAN (\$945).

- Saber Software Corp. in Dallas announced the Saber LAN Administration Architecture Toolkit and Windows-based LAN Administration Architecture Console/Real Time. The toolkit is said to meter applications, take hardware inventory, log events and do file auditing, scheduling and disk monitoring. The console allows the administrator to incorporate information collected by the toolkit with other Windows applications.

- Networth, Inc. in Irving, Texas, announced Series 4000 Discovery Management System, a Windows-based system that is said to manage both Simple Network Management Protocol (SNMP)-compliant devices and Netware IPX systems. It supports SNMP Management Information Base I and II. It is scheduled to ship in the first quarter of 1991 for \$2,395.

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Banyan efforts reap plaudits from users

BY JOANIE M. WEXLER
CW STAFF

Networking company Banyan Systems, Inc. has kept its nose to the grindstone since it resolved to get its marketing house in order in mid-1990. Recent networking trade shows and user group meetings have seen the company squeeze in the last of its technical promises for 1991 and score credibility points with customers.

The jury is still out on whether the vendor can go beyond preaching to the choir and actually accumulate additional market share. However, existing customers are encouraged by the company's technical and marketing follow-through, vendor alliances and open systems movements.

"We're quite well-satisfied with the path we've seen Banyan taking," said James Martin, information systems technical consultant at Nissan Motor Corp. in Gardena, Calif., whose installation has grown from five to 30 Virtual Networking System (Vines) servers in the past year. "We've seen many im-

provements in the company's consistently communicating at all levels of the organization over the past year."

Within the last several weeks, Banyan released two new versions of its Vines local-area network operating system. Vines 5.0 rolled out at Networld '91 this month in Dallas, bringing Apple Computer, Inc. Macintosh clients onto the Vines network [CW, Oct. 21]. While a bit overdue, the Macintosh rounds out Vines support of MS-DOS, DOS-/Windows, OS/2 and Macintosh clients.

"We've been looking to offer users more flexibility in their workstation selection; now they can pick a Mac or a PC," said Jonathan Oski, senior technical engineer at Bank of Tokyo Financial Corp., a 1,500-node Banyan shop in Boston.

Vines 4.11 delivered

At a Banyan user group meeting in Los Angeles last month, the company delivered Vines 4.11, which added a bevy of LAN administration, wide-area networking, IBM Systems Network Architecture connectivity and

security features to the network operating system [CW, Sept. 30].

"We didn't have bilevel security before, which is important," said Linda DuRussell, communications programmer in the network planning and design division of Vines shop Pennsylvania Blue Shield in Camp Hill, Pa.

"For example, if we have a department manager who gives a secretary full access to a directory on a server, then puts that secretary's performance review on the server, the manager may want to be able to partition that access."

Kevin O'Neill, vice president of network research and consult-

ing at Business Research Group in Newton, Mass., said a recent study done by his firm showed network security to "be the sleeper issue just behind network management. As LANs grow, users are looking for finer granularity in their access control. The new Vines version adds that further refinement."

DuRussell also applauded the Vines 5.0 capability to change server parameters from any system in the network rather than having to be at one designated console.

While some non-Banyan users acknowledged the company's progress, they said they are not likely to change their existing installations because of Banyan strides. For example, Bruce Russell, a technology architect at Amex Life Assurance Co. in San Rafael, Calif., who runs Microsoft Corp.'s LAN Manager and Novell, Inc. Netware, said, "We would not convert away from what we have unless Banyan came in with a full solution and Novell were to stumble."

The supervisor of a workstation and LAN group at a large West Coast insurance firm who has 450 IBM LAN Server networks said, "Only if we reached some technical barrier would we evaluate another LAN."

PC LAN purchase criteria

Banyan's recent network enhancements and vendor alliances may help it address user priorities cited in a recent independent study

Percent of respondents rating criteria "most important"

Compatibility with existing LANs	31%
Vendor reliability	20%
Quality	12%
Commitment to open systems standards	11%
Lowest price	9%
Post-sale support	8%
Highest performance	5%
Technical innovation	2%
Other	2%

Base: 400 Fortune 1,000 firms

Source: Business Research Group

CW Chart: Michael Siggins

IS managers urge more X.400 E-mail solutions

BY JIM NASH
CW STAFF

Information systems managers said they are encouraged by electronic mail products and services announced this month at Networld '91. Some, however, said they felt the goods are moving in a different direction than big companies bent on adopting the X.400 messaging standard.

A passel of companies announced new versions of existing E-mail software, new features and new services. Among them was Compuserve, Inc.'s new Mail Hub service for mail packages based on Novell, Inc.'s Netware Message Handling System (MHS) protocol. Subscribers to Compuserve now can link to MHS for a fee in an extended mail network.

According to Beyond, Inc., it expects to ship next month Forms Designer, software that enables end users within a company to create their own forms for transferring information via E-mail.

Both Digital Equipment Corp. and Futurus Corp. announced that their E-mail software will support Microsoft Corp.'s Windows. Enable Software, Inc. said it is shipping two new software modules. One, Exchange Monitor, watches Enable's Higgins software for signs of downed links. The other, Higgins Dispatch, collects data stored in personal computer applications

— such as sales figures — and automatically distributes it as a message.

The announcements, said Don Gilbert of the American Petroleum Institute in Washington, D.C., "are very, very good for the low-end systems' users." Gilbert, who is both IS director at the institute and chairman of the Electronic Mail Association's interconnection committee, said larger companies are increasingly looking to X.400-based systems, which address broader issues such as tying electronic data interchange into internal mail systems.

Few of the new products and

services are unique, said Steve York, manager of information exchange technologies at Los Angeles-based Hughes Aircraft Co. But, York added, they indicate that the industry is taking E-mail more seriously. He said secondary players in the market are adopting features, such as integration of messaging with applications, that larger vendors have offered.

Bill Cotter, vice president of international IS at Warner Brothers, Inc. in Burbank, Calif., said Warner pulled away from MHS a few years ago when multiple versions were being floated by various vendors. Warner now uses Softswitch, Inc.'s mainframe-based E-mail systems linked to an MCI Communications Corp. hub, effectively duplicating the Compuserve/MHS service for higher end systems.

Compuserve, based in Columbus, Ohio, has added Mail Hub to its services for hourly rates of \$11 to \$27.50. Users must have Netware MHS Version 1.5 and 1.5C. Higgins Dispatch and Exchange Monitor, both from Alameda, Calif.-based Enable, are immediately available for \$995 each.

DEC's All-In-1 Mail for Windows, which is an X.400-based system, supports Dynamic Data Exchange. It costs \$129 and is slated to be available in December. Futurus, in Metairie, La., is selling five-user licenses for Windows and DOS versions of Right Hand Man II for \$495; 25-user licenses for \$1,995 and 100-user licenses for \$4,995.

Users frown at LAN plan

CONTINUED FROM PAGE 51

company's manager of SNA software engineering. But the workstation cannot handle SNMP management, and most of the LAN interconnectivity devices Travelers and other companies are implementing support that protocol, Layland said.

To make the decision even harder, IBM's own promised RISC System/6000-based router is likely to support SNMP as well, Layland said. This means that users such as Travelers may need IBM's SNMP-based workstation even if they stick with all IBM network equipment, Layland pointed out. "We're having an internal debate: SNMP or LAN Network Manager because we don't like the idea of both."

IBM has no immediate plans to merge the two workstations or to provide SNMP on LAN Network Manager, said Sanjiv Ahuja, IBM's AIX network management product manager. IBM will enable users to integrate the two stations' management functions through links to Netview, its host-based management platform, he added.

Right now, IBM's LAN Network Manager has a strong lead over SNMP in the LAN management arena, according to Business Research Group. The Newton, Mass., firm's recently published study of 400 IS executives in Fortune 1,000 companies found that of the 148 respondents that used PC LAN

management packages, 39% used LAN Network Manager and/or Netview. In contrast, only 1.4% said they used SNMP to manage PC LANs.

While there is no doubt that Netview and LAN Network Manager are gaining dominance in IBM LAN installations, SNMP is growing in non-IBM LAN and internetworking sites, Business Research Group senior analyst Tom Wood said. Thus, as more firms seek to integrate their SNA and LAN backbones, the question of how to manage such installations is causing controversy, he added. "LAN administrators we interviewed told us one of the biggest problems was getting host and internetworking people to work together."

IBM is offering users the OSI-based LAN management protocol to give users a broader choice

of management standards — and to expand the range of LAN devices that LAN Network Manager can handle, IBM spokespersons indicated.

This leaves a hard choice for companies that are primarily IBM shops, but which also have non-IBM LAN installations. Metropolitan Life Insurance Co., for example, likes the idea of using IBM's LAN Network Manager to gather LAN statistics and send them up to Netview, according to Steve Bortnyk, the company's network management director. This would further Met Life's goal of centralizing more of its LAN administration functions, he added.

Nevertheless, Met Life is still uncertain as to whether IBM's OSI-based LAN management protocol "will get the vendor support we need," Bortnyk said.

Wexler

CONTINUED FROM PAGE 51

This month's Communications Managers Association (CMA) show in New York emphasized ISDN. Yet when users in a general session headed by Bellcore asked how ISDN supported certain applications differently than other switched services, a Bellcore representative stammered, "Well, the other technologies aren't as ubiquitous." According to Bellcore timetables, however, ISDN is on a similar deployment schedule with frame relay and SMDS.

At the Interop session, Bellcore proclaimed that "the frame relay and SMDS wars are over." Well, perhaps the civil wars have ended within the phone companies. Bellcore, which has been working on ISDN and SMDS for years, saw the competitive light in the 11th hour and decided to add frame-relay services to its dance card. But that doesn't clarify choices for users.

Once network planners do settle on a wide-area scheme, they will probably have to justify this intricate blueprint to senior managers who don't have much patience with hearing about a "connection-less" vs. a "connection-oriented" solution. So where do users go for objective help? Some straight education from Bellcore — not just about deployment plans but also about how different technologies

THE "CORRECT" WAN decisions boil down to how much traffic you have going where and for what duration.

fit various applications and complement each other — might be in order.

I hope Bellcore doesn't bury itself too deep in touting service deployment goals and miss the marketing potential of helping users compare and contrast WAN technologies. CMA President Charlie Murray noted that with recessionary times seeing leaner networking staffs, users are hungry for such consulting help.

These issues will be addressed during the next several weeks in *Computerworld* in articles that will synthesize user experiences and research as well as information on price, speed, availability and applicability of technologies from vendors, carriers and analysts.

As a simplistic precursor, keep this in mind: The "correct" WAN decisions boil down to how much traffic you have going where and for what duration. Does your networking traffic stay within the company or run between businesses? Is it LAN-to-LAN, mainframe-to-mainframe, terminal-to-host? Do you want bandwidth completely on the fly or can you endure a certain amount of call setup delay, such as with a videoconference?

These are among the questions you must ask before you can start peeling away the layers of possibilities for each technology. One day, the universe will be one big communicating entity buried under layers of protective interfaces. Since that isn't likely to happen during your career, however, you'd best begin your WAN homework now.

Wexler is a *Computerworld* senior writer.

NETWORK SHORTS

NIST tests routers

The **National Institute of Standards and Technology** said it has performed interoperability tests on routing equipment supporting the Open Systems Interconnect Intermediate System-to-Intermediate System protocol from the following vendors: 3Com Corp., Digital Equipment Corp., Proteon, Inc. and Wellfleet Communications, Inc.

Workstation vendor **Silicon Graphics, Inc.** said it will license Retix's OSI source code and bundle it into its workstation operating systems. Silicon Graphics said the products it will initially license include Retix's local- and wide-area transport products, X.400 messaging and File Transfer, Access and Management software.

AT&T said it will install this year public pay phones that function as "portable offices" in five major airports. Dubbed the AT&T Public Phone 2000, the phones enable travelers to plug in laptop computers or portable fax machines; a built-in keyboard allows users to access their electronic mail or dial up home or office databases. The phones are to replace AT&T Card Caller Public Phones, and when fully deployed, are slated to be in 85 of the top 100 airports, nine of the top hotel chains and in most major convention centers.

Wide-area networking vendor **Telematics International, Inc.** is reportedly discussing a possible merger with network integration products vendor Harris/Adacom Corp. In the proposed deal, Telematics would issue about 23 million shares of its common stock in exchange for all Harris/Adacom capital stock and vested stock options. Telematics has about 17 million shares of common shares outstanding.

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Networld

NCR and AT&T begin melding network lines

BY ELLIS BOOKER
CW STAFF

As expected, NCR Corp. has begun rolling its own networking product line together with that of AT&T, which became the Dayton, Ohio-based company's owner last month.

NCR recently announced several AT&T software and hardware products that had been added to NCR's year-old Open Networking Environment (ONE) scheme.

At the same time, NCR broadened the appeal of ONE — originally pitched as an Open Systems Interconnect-based archi-

ture — by adding support for some proprietary protocols. This was done in recognition that "customers aren't starting their networking plans with a clean slate," according to NCR Network Products Group Senior Vice President William T. O'Shea.

In particular, NCR rolled out products to support IBM's Systems Network Architecture (SNA), including a new, low-end SNA-compatible communications processor, the NCR Comten 5630.

The thrust of ONE, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C., is gateway services through

AT&T's Stargroup local-area network software.

"The key of ONE at this moment is an embracing gateway structure, which allows an anything to anything [connection] but under a standards-orientated structure," he said.

Broader range

Dzubeck added that the AT&T products have also broadened the range of ONE, allowing it to address smaller work groups and LANs that NCR's ONE missed for its enterprisewide orientation.

The AT&T networking products that are now in the NCR ONE camp and avail-

able to NCR's worldwide distribution channels include these items:

- AT&T's Starlan family of LAN systems for twisted-pair, coaxial cable, fiber or wireless networks.
- AT&T's Starwan line of internetworking bridges, routers and communications processors, including a Micro Channel Architecture (MCA)-based subsystem for the NCR Comten 5600 that allows users to use a variety of third-party MCA adaptor board products.
- AT&T Stargroup multiprotocol networking software, as well as Stargroup LAN Manager 2.0, a version of LAN Manager under Unix System 2.0.
- AT&T Starsentry for network management and control, including two applications to manage DOS and OS/2 systems.

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Network management

Network Application Technology has announced the LANB/250 Remote Ethernet.

The LANB/250 monitors local-area network segments via dial-up lines and over Ethernet cabling. Network managers can dial into the unit for data in the event of a dedicated cabling failure. The product (\$1,795) supports the Simple Network Management Protocol and allows the network manager to define monitoring criteria and alarm thresholds.

Network Application Technology

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Campbell, Calif. 95008
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Gateways, bridges, routers

Racal-Datcom, Inc. has announced bridge/router products for Token Ring, Ethernet and Fiber Distributed Data Interface networks.

The RNX 6200 and RNX 6500 support all major protocols and offer wide-area network interfaces including T1/E1, frame relay and X.25. The 6500 model also adds 64K bit/sec. support.

The RNX 6200 (starting at \$6,265) is intended for low- to medium-density sites; the RNX 6500 (starting at \$8,795) accesses packet headers at speeds up to 800M bit/sec. and is intended for larger sites.

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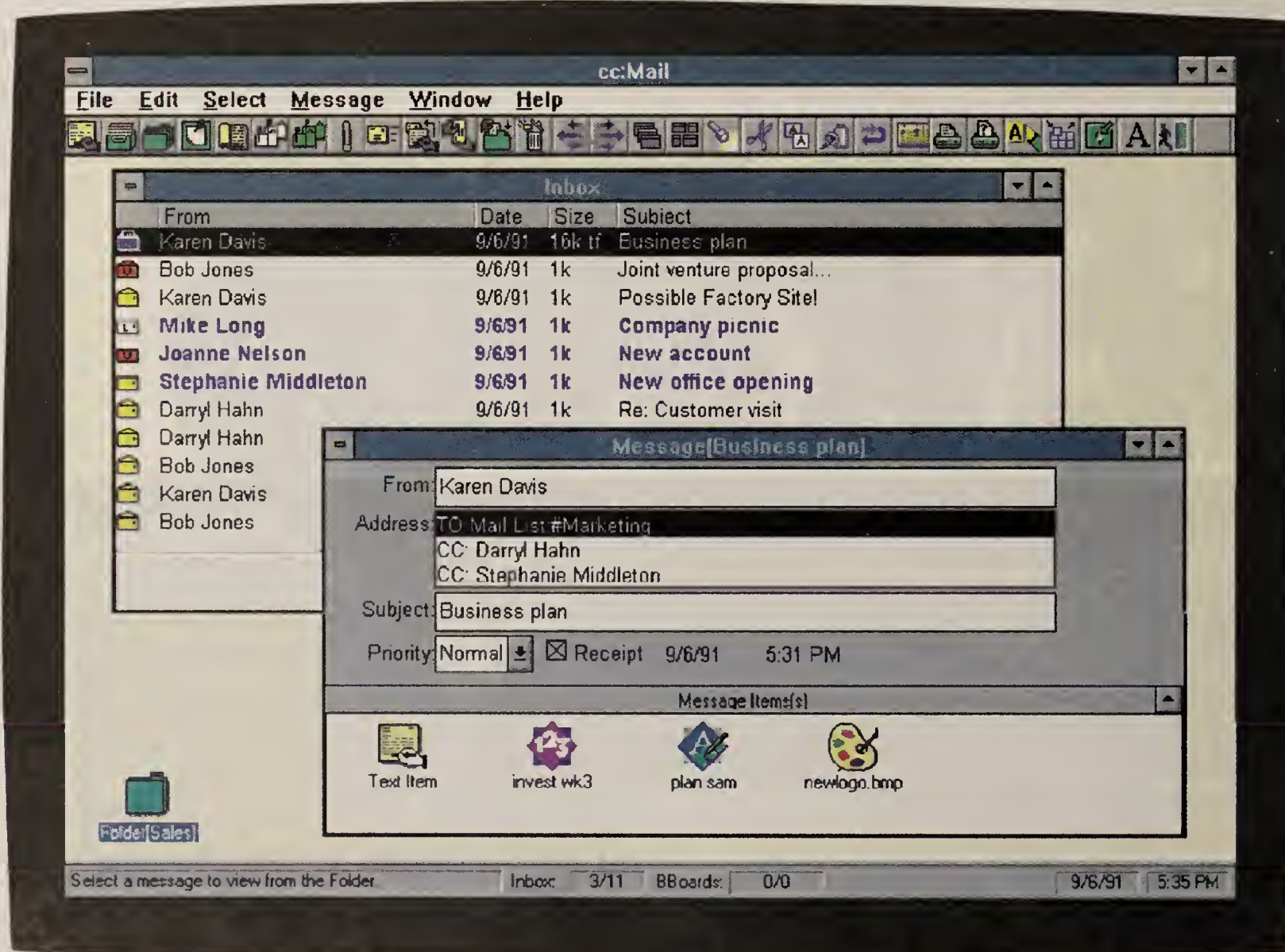
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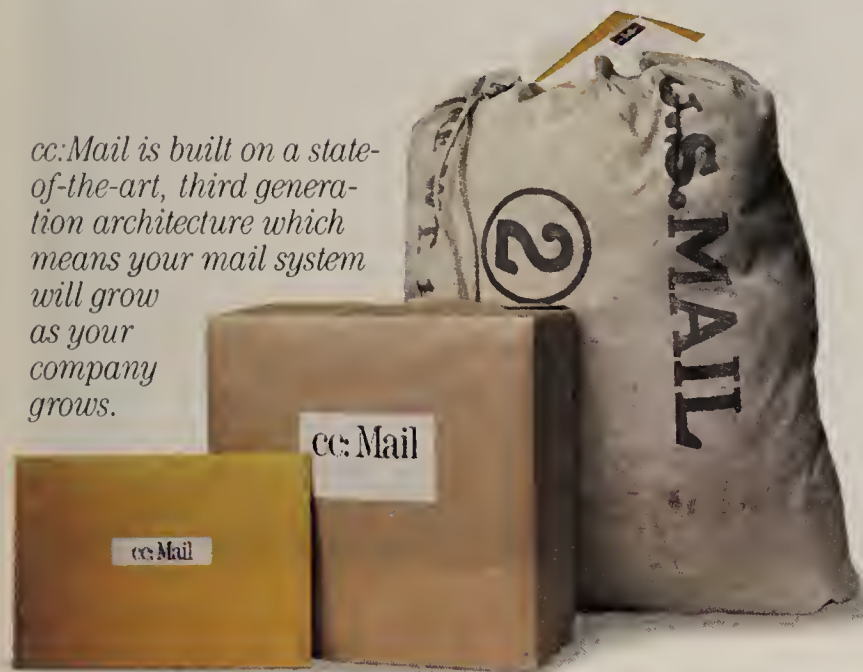
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**LAN TIMES
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EXECUTIVE TRACK



James C. Goodlett has been named vice president and chief information officer at **Carlson**

Co., an \$8 billion privately held hospitality, travel and direct-marketing firm based in Minneapolis.

Goodlett, 54, was most recently vice president and general manager at the data processing services unit of Societe Internationale de Telecommunications Aeronautics in Atlanta.

Before that, he held senior executive positions in information systems, data processing and communications at Texas Air Corp., CCS Automation Systems, Continental Airlines, Texas International Airlines and United Airlines.

He holds two bachelor's degrees from Southern Methodist University and a master's degree from Texas A&M University. He is a member of the American Management Association and the Association for Computer Machinery.

Philadelphia Newspapers, Inc., owners of *The Philadelphia Inquirer* and *The Philadelphia Daily News*, announced one new appointment and two promotions in information systems, effective Nov. 1.

Tom Sims was named vice president of systems and technology. He had been director of IS at Knight-Ridder, Inc. in Miami, Philadelphia Newspapers' corporate parent since 1977. He played a key role in developing the former Knight-Ridder newspaper in Pasadena, Calif., into the world's first fully paginated newspaper.

Sims holds a bachelor's degree from Auburn University, a master's degree from the Georgia Institute of Technology and an MBA from the University of Miami. He is a captain in the U.S. Coast Guard Reserve.

Al Vaccaro was promoted to director of business systems. He had been associate director of business systems.

Jim Pecora was promoted to manager of end-user services. His previous position was information center supervisor.

Cleanup efforts target 'dirty' data

Pollution control firms use technology to ensure data accuracy and avoid fines

INDUSTRY CLOSE-UP

IS in Pollution Control

BY JULIA KING
SPECIAL TO CW

Ask Steve Hanna, chief of data management at California's Office of Environmental Protection, about the quality of environmental information kept by companies that produce, transport and dispose of hazardous waste, and chances are he will refer you to a map.

This map is supposed to indicate the exact locations of facilities run by the 2,000 companies that report information to his office.

Plotted from latitude and longitude data furnished by the companies, the map indicates that there are facilities floating in the Atlantic and Pacific Oceans, in parts of Africa and even at the North Pole. "According to this, 10% of California's facilities are not even in California," Hanna says.

A wry comment from an environmental regulator isn't all pollution control companies can expect if they have inaccuracies in the reports they are required by law to file with the federal Environmental Protection Agency (EPA), state EPAs and transportation agencies and local authorities, such as water and sewer departments. Firms have been fined, hauled into court or shut down altogether after the discovery of data irregularities, notes Ken Kamlet, a principal at A.T. Kearney, Inc.'s Environmental, Health and Safety Practice in Alexandria, Va.

Last year, for example, Illinois EPA

regulators slapped Oak Brook, Ill.-based Chemical Waste Management, Inc. with a \$260,000 fine for paperwork discrepancies in records submitted to the EPA.

To avoid such costly consequences and ensure data quality and integrity, companies are implementing fully automated data collection systems as well as uniform validation software programs for their data. Validation pro-

grams they have to screw them up," says Tom Ellis, a partner in Arthur Andersen & Co.'s computer risk management service in Dallas.

Cutting down on human involvement in the tracking process is the goal at Chemical Waste Management. With the reason for last year's fine still fresh in its mind — it was reportedly imposed because employees failed to manually record data already being automatically collected by the company's computer system — the firm has



Richard A. Goldberg

grams may include procedures for checking companies' daily logs against weekly or monthly summary reports or for comparing chemical codes and other data entered into logs against the chemical codes and names that must be used in regulatory reports.

Human error is the biggest culprit in data corruption for pollution control companies — and companies in other industries, for that matter.

"This is because the more times people touch things, the more opportu-

integrated bar-code and radio technologies into its on-line waste-tracking system. In this way, it hopes to reduce the number of times system data must be manually entered or changed.

Upon receipt at any of the company's 20 locations, waste units are logged into a corporate local-area network and issued a bar code containing three separate identification numbers, which allow the company to track the type and amount of waste as well as pinpoint its location throughout the

Continued on page 62

Software sharing eases cities' budget crunch

BY CLINTON WILDER
CW STAFF

Cash-starved municipal governments have found a low-cost source of software applications: each other.

Thanks to the computer bulletin boards of Government Management Information Sciences (GMIS), a national user group of about 700 information systems professionals, local governments seeking particular applications can find out if other cities are using them. Instead of buying or developing a new package, a city can simply transfer the code already in use by another city and customize it.

The city of Yonkers, N.Y., has two such transferred applications running

on its IBM 4381 — a vehicle fleet maintenance program developed by the city of Virginia Beach, Va., and a building inspection and permits application program from Fairfax County, Va.

To develop or buy both applications would have cost at least \$400,000 and taken 18 to 24 months, said John Moody, Yonkers' director of MIS. Instead, the systems were installed in six to eight months with minimal costs for tape, documentation and travel to Virginia by users and IS staff members to check out the system.

"It is so important today to draw on resources that are not the norm," Moody said. "Our funding sources have been curtailed, and our revenues are off. We have to find a better way of trying to serve our users."

Moody should know: His IS budget has been cut from \$1.9 million to \$1.7 million in the past two years, which cost seven of his 38 employees their jobs. "Doing more with less" is the credo, and the service of Wichita Falls, Texas-based GMIS was just the ticket.

"These are the kinds of applications that might never have gotten off the ground at all," Moody said. "I don't think we could have sold them at budget time — but they are systems that directly affect the public and the kinds of services the city can deliver."

Yonkers has been on the "provider" side of this sharing arrangement as well. It transferred a Wang Laboratories, Inc. minicomputer-based citizens' complaint processing application to nearby Orange County, N.Y., and was the "transferer" of the Virginia Beach fleet maintenance software to Ulster County, N.Y.

C A L E N D A R

Profit Oriented Systems Planning Program (POSPP) will hold a special interest meeting for POSPP members Nov. 18-19 in Scottsdale, Ariz. It is entitled "Breaking the Barriers: Strategic IS Planning Amidst Shifting Paradigms."

Speakers include Robert J. Benson, dean of the School of Technology and Information Management at Washington University; Theodore Klein, president of Boston Systems Group; and Jack Crawford, vice president of information management at The Hartford Insurance Group.

For more information, contact POSPP in Carrollton, Texas, at (214) 250-3644.

NOV. 17-23

The New Tools Conference. New York, Nov. 17-20 — Contact: The Center for Computer Graphics for Design, Briarcliff Manor, N.Y. (914) 741-2850.

Guide 81. New Orleans, Nov. 17-22 — Contact: Guide, Chicago, Ill. (312) 644-6610.

Perspectives '92. Columbus, Ohio, Nov. 18 — Contact: Gail Whitcomb, Sterling Software, Inc., Columbus, Ohio (614) 793-7142.

Multimedia Expo. San Jose, Calif., Nov. 18-20 — Contact: American Expositions, Inc., New York, N.Y. (212) 226-4141.

Sapphire '91. New Orleans, Nov. 18-20 — Contact: Systems Applications and Products, Lester, Pa. (215) 521-4500.

USA/East Africo Expo '91. Nairobi, Kenya, Nov. 18-20 — Contact: World Access Corp., Wellesley Hills, Mass. (617) 235-8095.

DEMA'S 15th Anniversary Conference & Exposition. Dallas, Nov. 18-20 — Contact: Data Entry Management Association, Norwalk, Conn. (203) 846-3777.

C++ At Work. Santa Clara, Calif., Nov. 18-22 — Contact: Wang Institute of Boston University, Boston, Mass. (508) 649-9731.

Mopping the Future of Computing and Communications. San Francisco, Nov. 19-20 — Contact: Lucy Kehoe, Northeast Consulting Resources, Boston, Mass. (617) 859-0859.

Wescon '91. San Francisco, Nov. 19-21 — Contact: Electronic Conventions Management, Los Angeles, Calif. (213) 215-3976.

User Alliance for Open Systems Meeting. Reston, Va., Nov. 20-21 — Contact: Ed Albrigo, Corporation for Open Systems, Reston, Va. (703) 883-2700.

The 2nd Usenix Moch Symposium. Monterey, Calif., Nov. 20-22 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649.

Computer Publishing. New York, Nov. 22-24 — Contact: Joan Barnett, CMC, Norwalk, Conn. (203) 852-0500.

NOV. 24-30

Advanced Manufacturing Research's 5th Annual Executive Conference. Cambridge, Mass., Nov. 25-26 — Contact: Advanced Manufacturing Research, Cambridge, Mass. (617) 621-1700.

Espirit Conference. Brussels, Nov. 25-29 — Contact: Espirit Conference Secretariat Commission of the European Communities, Brussels, Belgium (32 2) 2363103.

European Multimedia Computing Exhibition. Jaarbeurs, Utrecht, The Netherlands, Nov. 28-29 — Contact: Interactive Learning Services Ltd., Den Haag, The Netherlands 31 (0) 70 35 60 666.

DEC. 1-7

The Doto Warehouse: Design and Implementation. Orlando, Fla., Dec. 2-3 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

Imago World. Miami, Dec. 2-6 — Contact: Knowledge Industry Publications, Inc., White Plains, N.Y. (914) 328-9093.

The Outsourcing Conference. Boston, Dec. 3-4 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Couse '91. Anaheim, Calif., Dec. 3-6 — Contact: Cause, Boulder, Colo. (303) 449-4430.

A/E/C Systems. Toronto, Dec. 4-6 — Contact: Kelly Baxter, A/E/C Systems, Chadds Ford, Pa. (215) 444-9583.

Technology 2001. San Jose, Calif., Dec. 3-5 — Contact: Technology Utilization Foundation, New York, N.Y. (212) 490-3999.

Doto Concepts '91. Boulder, Colo., Dec. 5-6 — Contact: Data Storage Concepts, Boulder, Colo. (303) 444-4840.

DEC. 8-15

Document Image Automation. Washington, D.C., Dec. 9-11 — Contact: Meckler Conference Management, Westport, Conn. (203) 226-6967.

Netcom '91. Washington, D.C., Dec. 9-12 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

Computer Measurement Group International Conference. Nashville, Dec. 9-13 — Contact: CMG Headquarters, Chicago, Ill. (312) 527-6652.

PC Windows Exposition and Conference. San Francisco, Dec. 10-11 — Contact: PC Windows Exposition and Conference, Framingham, Mass. (508) 879-6700.

EDIA's 23rd Annual EDI Users Conference & Exhibit. San Diego, Dec. 10-12 — Contact: The Electronic Data Interchange Association, Alexandria, Va. (703) 838-8042.

Software Quality Monogement. Chicago, Dec. 10-12 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

Doto '91. Miami Beach, Dec. 10-12 — Contact: International Solutions, Inc., Washington, D.C. (202) 363-8877.

Dexpo Fall '91. Anaheim, Calif., Dec. 11 — Contact: Dexpo Fall '91, Boston, Mass. (617) 232-3976.

Flot Information Displays Conference and Exhibition. Santa Clara, Calif., Dec. 11-12 — Contact: Murray Disman, Information Associates, Inc., Menlo Park, Calif. (415) 322-0247.

Simulotion Conference. Arlington, Va., Dec. 12-16 — Contact: Herb Schwetman, Austin, Texas (512) 338-3428.



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BOOK REVIEWS

Is a lot of information
a dangerous thing?**Cyberpunk**

A film by Marianne Trench and
produced by Peter von Brandenburg
Intercon Productions
Mystic Fire Video, New York, \$29.95

If a band of powerful computer hackers whose ethic is, "Information wants to be free," either terrifies or intrigues you, this film is worth a look-see.

Cyberpunk, a video documentary on the phenomenon of young people who re-

fer to themselves by that science-fiction term, is a sometimes disturbing and fascinating look into the fringes of both computing and ethics. The cyberpunk movement embraces virtual reality, bionic medicine, "smart" weapons and more.

Award-winning science-fiction author William Gibson, a self-admitted nontechie who coined the term cyberpunk, is featured prominently in the documentary. Many of Gibson's fictional characters and the concepts he depicts in his novels have already become reality.

The 60-minute video is filled with images of everything from conversations with "cyberhero" Michael Synergy, who says if he felt it were necessary, he could take down the entire U.S. banking system; to '60s radical Timothy Leary who

theorizes that there will be no utopia for cyberpunks because there will always be people who go too far; to the music of cyberpunk-spawned punk rock bands.

Trench packs the film with information but keeps it slick and interesting. The narrator's voice is soothing. Other topics covered in the video include a detailed look at virtual reality, interviews with hackers describing computer crime and a talk on the concept of smart medicine and smart drugs.

Cyberpunk is not without its flaws, however. The high-tech look of the film can be overwhelming at times. A viewer can be distracted by the constant real-life images enmeshed with computer-generated graphics that flit across the screen. In interviews with computer hackers who

requested anonymity, for instance, a computer-generated devil-like face with a continuously wagging tongue shields the hacker's face. While it hides the face, it is also rather annoying.

ALAN J. RYAN

Keeping Good People: Strategies for Solving the Dilemma of the Decade

By Roger E. Herman
McGraw-Hill, Inc., \$19.95

Each day, managers try to attract "good" workers to their firms. Yet, once hired, companies must keep workers satisfied, productive on the job and loyal to the company and its goals. *Keeping Good People* is a thorough, well-written guide that demonstrates how a business can hold on to its best employees.

Herman delves into various desires and concerns of today's work force, concerns that are easily applicable to information systems as well as other disciplines. These include such things as opportunities for professional growth, a comfortable and healthy work environment, flexibility on the job, benefit programs and general satisfaction in working for the company.

The author points out that it is up to managers to identify what makes people feel enriched — whether it be money, a prestigious title or even some type of social life in the office.

Herman outlines more than 125 techniques to meet these needs: Some are intangibles such as being a good listener or showing respect; others are more concrete, such as providing stock-ownership plans and child-care services.

This 292-page book is fairly easy to read; numerous subchapters allow the reader to skip around to pertinent sections. Because the author provides a clear understanding of what today's worker wants, *Keeping Good People* is applicable to any industry.

STEVEN J. CONDON

Software Shock: The Danger and the Opportunity

By Roger S. Pressman
and S. Russell Herron
Dorset House Publishing, \$18.95

Athletes, when stuck in a rut, are counseled to get back to basics; a return to the fundamentals will allow them to better use all their skills, or so the theory goes. *Software Shock* provides a similar push for programmers but also gives a broad perspective on software for those who think that software is either magic or a pain in the neck. The title is derived from Alvin Toffler's *Future Shock*, and the 206-page book aims to counter the "stress and disorientation" suffered by a society controlled, whether or not it knows it, by software.

Pressman, a software engineering consultant, and Herron, a supervisor at Exxon Corp., mix real-life examples of attitudes about software that can lead to both success and disaster. In the process, they also help to demystify software. They write in a highly readable style and avoid moralizing. Moreover, the authors achieve their goals of helping people understand software technology in a general sense and formulating a book worth reading by their broad target audience: the computer wary, computer users and computer aficionados.

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COMMENTARY

Clinton Wilder

A painful revolution



Back in the mid-1980s, a sense of buoyant optimism pervaded the U.S. business world. The nation was being transformed from a manufacturing to a service

economy, fueled in large part by information technology. The vision of the future, as laid out by authors such as John Naisbitt, was a near-Utopian global village in which worldwide computing and telecommunications capabilities supported robust, diversified, services-oriented prosperity.

As the information systems community grapples with its 1992 budgets today, the world looks very different from this vision. Exciting IS implementations that are reshaping functions and companies are out there, to be sure. But the more likely words on the minds of IS executives are recession, cutbacks, consolidations and outsourcing.

Is the brave new world of information technology losing its nerve?

My sense is there is a quiet but painful revolution under way — one that is fundamentally transforming the way information technology is used and managed in corporate America. Blood will be spilled, battles will be won and lost, and a new power structure will emerge.

A major salvo in this revolution has been fired by Morgan Stanley senior economist Stephen Roach in the current issue of the *Harvard Business Review*. Roach, who has written in the past on the failure of technology to improve white-collar productivity, now proclaims that the services sector of the U.S. economy is in deep trouble.

Service industries, Roach writes, have allowed their fixed-cost structures to grow out of control. Unlike the bricks, mortar and factories of manufacturing firms, the fixed costs of service companies are people — and computers. The promise of information technology was oversold, and companies overspent on IS. Banks, airlines and other firms are now trying to shed those costs via mergers and consolidations and — although Roach doesn't say it — by outsourcing.

Significantly, however, Roach does not advocate a cost-slashing approach to the problem. That was the mistake made by U.S. manufacturers in the past when lower priced products from Asia began to gobble market share. "As soon as U.S. manufacturers matched competitors on the cost front," Roach writes, "they began to lose ground in quality enhance-

ment and production flexibility."

Roach's solution is not new, but it is more important than ever and applies to manufacturing as well. Companies must analyze their businesses from stem to stern and determine which activities add significant value to their mission. Those activities must be enhanced, even if it means additional investments in people or technology while other areas are being pruned or chopped.

THE BIG PAYOFFS from IS come when the technology enables the company to do something old in an entirely new way, or to do something it has never done before.

So where does information technology fit in? Absolutely everywhere — but not in the traditional sense of spending to automate. IS budgets are being cut, but IS is more critical than ever.

That is not a contradiction in terms. It simply means that IS spending must focus on where it can deliver the most value. Making that determination is the hard part because the answers usually lie in virgin territory — reshaping the entire way insurance claims are processed, for

example, or figuring out a new way to forecast retail buying patterns. The big payoffs from IS come when the technology enables the company to do something old in an entirely new way, or to do something it has never done before.

In this environment, any company that has a wide gulf between the IS, and the business side is essentially doomed. Merely "aligning technology with the business strategy" is not enough. That is solving yesterday's problem. The two sides must be coordinated and must speak the same language from the beginning.

So far this year, Merrill Lynch, Mellon Bank and Du Pont have placed businesspeople in charge of their IS functions. Others are sure to follow. The IS manager who is not a businessperson first and technologist second is being squeezed out: at the top by executive appointments like those cited, and at the bottom by line managers empowered by the technology on their desktops.

In companies where IS is not integrated, it becomes a very inviting target for across-the-board budget cuts. That may help the bottom line in the short term. But gutting the IS infrastructure is a prescription for long-term competitive disaster and will only widen the gap between corporate winners and losers in the not-so-rosy days ahead.

Wilder is *Computerworld's* senior editor, management.

Cleanup efforts for 'dirty' data

CONTINUED FROM PAGE 59

transport and disposal process.

Before any units are moved, warehouse workers using handheld computers with radio frequency capabilities check these identification numbers against a central on-line database, which is updated each time a new shipment is logged in. Er-



Chemical Waste Management's system flags data errors by beeping

rors, such as incorrectly entered locations or identification numbers, are flagged immediately via a beeping signal issued by the portable computer.

"Because changes are the biggest source of errors in a database, the key to data integrity is to get information right the first time," explains Mike Hansen, the company's information systems director.

The automated tracking system is more reliable than manual methods, Hansen says. The company has not collected any performance statistics per se, "but last month, we had a facility with no discrepancies at all, when usually there are at least some number of documents that don't match up and that must be reconciled," he notes.

Immediate error detection is critical for Air and Water Technologies Corp.

(AWT), an environmental services firm in Branchburg, N.J., which, among other things, provides real-time tracking of emissions for utility companies. Under the Clean Air Act of 1990, utility companies are allotted a certain number of emission credits, which, if exceeded, can result in fines in the millions of dollars.

Thus, it is essential for both the utility and AWT, which jointly track the information, to get data right the first time. If an error is found, they will either individually or jointly take corrective measures, depending on the source of errors.

"All data is real time, so you can't go back and get it again. This data creates indictable situations [for the utilities], which is why data quality is a risk management issue for us," says Terry L. Nixon, vice president of information services.

To reduce the risk of losing or garbling any of the real-time data it collects and tracks for the utilities, AWT has adopted a strategy of redundancy, building two separate transmission networks to receive utilities' emission information. These networks, in turn, are tied to two separate CPUs running applications software with embedded validation checks.

Valuable validation

Validation checks are a key part of data integrity at Unison Transformer Services, Inc. The Charlotte, N.C., company has implemented a personal computer-based system for tracking PCB electrical transformers and 55-gallon drums of PCB transformer oil it transports and disposes of for its thousands of customers.

Tracking data is first entered into the system by a receiving clerk when waste is delivered to any of Unison's four facilities. Each drum is assigned a unique identifica-

tion number and its contents are recorded. From there, each time a drum is moved, workers make corresponding entries into PCs at the sites.

Throughout the process, data quality is checked via validation procedures embedded in the system's applications software, all of which was developed in-house. For example, waste cannot be shipped outbound from any Unison facili-

ty unless it has been entered into the computer system and has been assigned an identification number.

This is important, consultants say, because by law, companies must be able to make data available to regulators who can conduct unannounced spot checks.

King is a free-lance technology writer based in Ridley Park, Pa.

EPA to go EDI

Pollution control companies may be able to file government-required environmental data electronically as early as next year, following pilot tests of an ANSI X.12 transaction set developed by the National Governors' Association in conjunction with state and federal environmental protection agencies (EPA).

Once implemented, experts say, the electronic data interchange (EDI) system would work to improve data quality significantly and to reduce errors in environmental reports, which many companies still prepare by hand.

"Under the current system, facilities take their data, manually fill out forms, then send them to state agencies where they are re-keyed and sent to the federal EPA," explains Richard Hayes, director of the National Governors' Association's information management program.

"With EDI, we'd replace this transcribing process at facilities and at the state level, reducing the opportunities for error," he says.

State environmental agencies in Pennsylvania and West Virginia are involved in pilot testing, which has focused on manifests and reports required under the federal Resource Conservation and Recovery Act. Reports are sent from pollution control facilities to the two states' environmental agencies over a value-added network (VAN), which is also used to forward reports to the federal EPA. The state EPAs act as intermediaries between companies and the federal EPA to prevent firms or individuals from accessing federal EPA computers.

In the future, Hayes says, plans call for the federal EPA to furnish a VAN using the National Computer Center's network facilities. This VAN will perform error checking via built-in software that, among other things, will check companies' data for logical consistency as well as compare companies' figures against values allowable under certain EPA reporting guidelines.

Correct data will automatically be forwarded to each state's EPA, which retains copies for its records before forwarding reports on to the federal EPA. Incorrect data will be sent back to companies for correction.

JULIA KING

digital™

digital update

THE OPEN ADVANTAGE OCTOBER 1991

“The answer,” replies Ed Kamins, Digital’s manager of U.S. Distribution, “is nothing. Actually, we work hand in hand with our distributors. Digital can’t always do everything for everybody — and that’s where distributors come in.”

Kamins is sitting in his office under a large map of the United States. The map is speckled with multicolored pushpins showing the various locations of Digital authorized distributors throughout the country. More than 500 pins are on the map at points from the East Coast to the Pacific.

Authorized Digital distributors shouldn’t be considered an alternative to dealing directly with Digital, says Kamins. Rather, they should be seen as an extension of Digital’s sales force focused on specialized areas. In fact, distributors are often part of a Digital account team — in the role of handling specialized sales in large accounts.

To ensure you receive the same product expertise and personalized quality of service as you do from Digital, all distributors’ sales and technical people receive the same technical training as their Digital counterparts. In addition, a company must meet stringent Digital standards in order to become an authorized distributor.

Digital distributors are often part of a Digital account team, handling specialized sales in large accounts. It’s all part of our commitment to open business practices.

“The U.S. Distribution organization is part of Digital’s all-channels way of doing business to ensure customer needs are being met fully,” Kamins says. “We utilize OEMs with specialized product expertise, ISVs with particular application expertise, and our distributors, of course. What distributors give Digital is the flexibil-

ity to address the specific, unique needs of customers that we might not be able to deal with ourselves for any number of reasons. From a customer’s point of view, the source of the product, support, and services they’re receiving is much closer to the actual need. Delivery is quicker, response is faster, the process happens smoothly.

“Distributors also deliver a benefit similar to the ‘Just-in-Time’ philosophy of manufacturing,” continues Kamins. “As ‘Just-in-Time’ is used to lower costs to customers, distributors allow Digital to lower our costs of doing business, which ultimately ends up benefiting customers, of course.”

Kamins offers the example of a Fortune 50 company that regularly uses one of Digital’s largest distributors to handle a myriad of small orders for peripherals and other products. “The distributor’s area of expertise is in those types of orders,” he says. “Because of that, they can deliver products in a very short time frame. The customer gets the benefit of focused service combined with best price.”

Authorized Digital distributors carry comprehensive inventories of Digital equipment: workstations, networking products, VAX systems, UNIX-based systems, the application DEC 433MP SCO UNIX product, terminals, printers, and PCs — plus technical and support services. All distributors are also complete solutions providers.

For instance, distributors who sell Digital workstations can also offer a portfolio of software applications through their ties with software vendors.

“Our distributors’ relationship with ISVs is another source of strength that benefits customers,” Kamins notes. “There are literally thousands of applications available for Digital equipment, but it’s just not possible for any one salesperson to have in-depth knowledge about all of them. Many of our distributors have teamed up with ISVs in order to make sure that this body of software is known and available.”

Kamins notes that there are three different categories of authorized

Digital distributors: national full-line, regional, and specialty distributors.

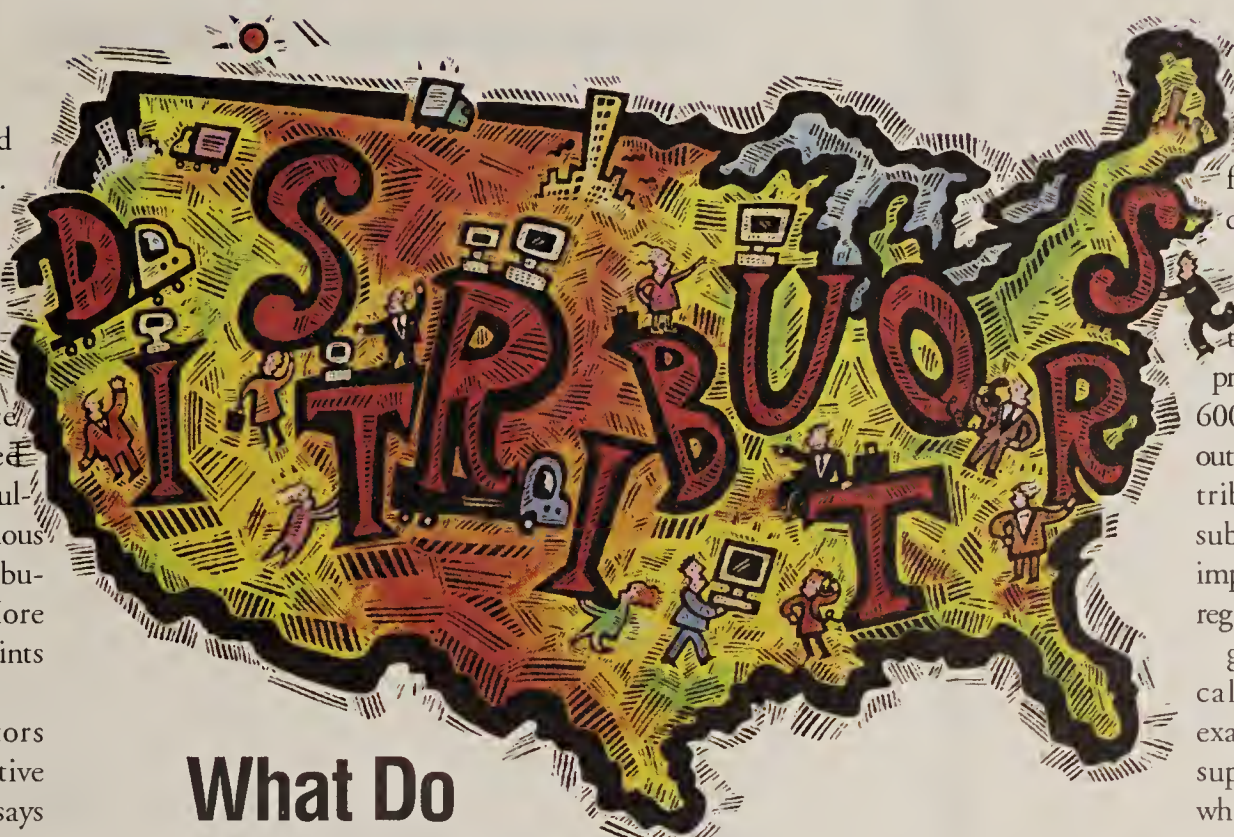
“While it’s somewhat of a generalization, national full-line distributors typically sell all Digital products up to and including the VAX 6000 line, and have branches throughout the country,” he says. “Regional distributors are typically focused on a subset of products and, as the name implies, are usually located in a specific region of the country. The third category, specialty distributors, are typically focused in one area — for example, networking components, or supply and accessory products — in which they’ve developed an expertise.”

Kamins also notes a fourth category of distributors that Digital has helped to develop: minority- and women-owned businesses.

Digital distributors carry comprehensive inventories of Digital products — from VAX systems to peripherals, plus offer technical and support services.

“Two years ago we began to formally recruit and develop distributors run by minorities and women,” he says. Today, over 25 million dollars comes through that channel.

“Providing the right products at the lowest cost in the shortest time — backed by the right support — is Digital’s goal for each and every customer,” Kamins concludes. “Authorized Digital distributors are helping us make sure that this goal becomes reality.”



What Do Distributors Do That Digital Doesn't?



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October 1991

More on Distributors

Digital's Authorized Distributors at a Glance

NATIONAL:

Avnet Corporation 800-426-7999
Pioneer Standard Electronics, Inc. 800-874-6633
Pioneer Technologies Group, Inc. 800-227-1693
Wyle Laboratories 800-332-6995

REGIONAL:

Almac Electronics Corp. 800-426-1410
CompuServe Systems Integration Group 214-361-5578
MTI Systems Corp. 800-645-6530
Total Tec Systems, Inc. 908-906-6500

Desktop-Focused:

Computer Datacom, Inc. 800-334-2020
Computer Systems Corp. 800-428-0714
Continental Resources, Inc. 800-937-4688
Datec, Inc. 800-525-9905
Impact Marketing 800-345-1110
Inland Associates 800-888-7800
Midcom Communications, Inc. 800-643-2664
The Datastore, Inc. 800-533-4190
Trilogic Corp. 800-346-2933

Industry-Focused:

Comsel Corporation 800-432-3880
Falcon Microsystems 800-284-1367
French Gerleman 800-333-3122
Rawson & Co. 713-688-8126

SPECIALTY ACCOUNTS:

Anixter Bros., Inc. 800-232-0190
Azerty, Inc. 800-888-8080
Daisytek, Inc. 214-840-8100
Radgo 800-869-1986
Wesco 412-642-3563

MINORITY- AND WOMEN-OWNED:

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Input Output Computer Services 800-451-1033
Kimbrough Computer Sales, Inc. 303-425-0663
RJO Enterprises, Inc. 301-731-3600
SMA 804-627-9331

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Designed to support the unique needs and challenges of your organization for systems integration and multivendor system solutions. This includes training consulting, such as "Training Needs Analysis" to ensure the full understanding of your requirements. Custom course development and courseware delivery are tailored to your specific need.

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Includes courses at Digital facilities, at your site, and through seminars. Instructor-lead training greatly enhances learning retention and allows for significant knowledge transfer through the teacher-pupil relationship. On-Site/Exclusive Course Seminars deliver training on site or exclusively for members of your organization.

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Include courses by computer-based instructor, video, Digital Press books, and other flexible formats. Self-directed instruction

Packaged Training Solutions

Offer an extensive portfolio of packaged training solutions that includes subscription services, train-the-trainer programs, consulting, and startup services. Additionally, there are packages for volumes of coursewares, such as unlimited training subscriptions and EDUplan training, thus providing the flexibility to choose the courses you need when you want them.

Digital's open approach to training is yet another facet of Open Services — and one more way we're setting the standard for global support.

Call our Education and Training Hotline at 800-332-5656 for information about our FREE Training Planning Services.

Raise Your Hand If You Think Education and Training Are Important

At every turn, we're being challenged by change — demographic, economic, and technological. At the same time, the pressure is on to boost productivity while maintaining a competitive edge. Making a commitment to training and reskilling employees on current information technology is one way to stay ahead of the curve.

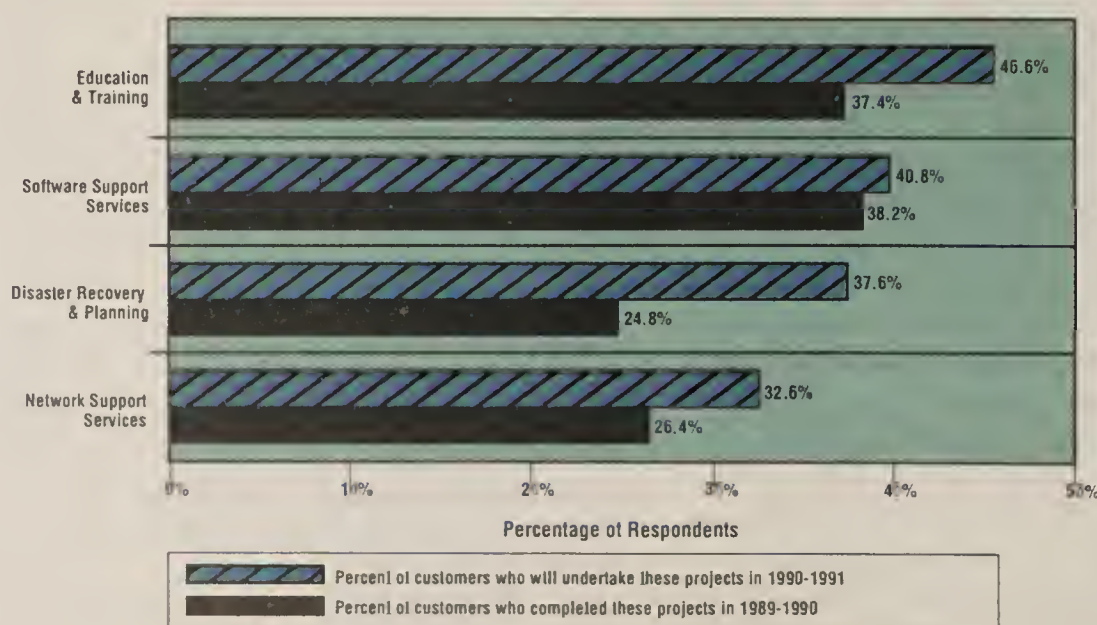
Handle It Inside? Or Go Outside?

It's often easier to see where employee education and training are needed than it is to decide how to go about doing it.

Managing training internally is a major (read that costly) investment in time and resources. One viable alternative is to outsource it — to contract the responsibility of course development and delivery with an outside vendor.

The benefits of outsourcing include potential cost savings and decreased administrative burdens on your part. Having an established vendor handle your training program ensures corporate-wide quality and consistency, with a relatively low risk of failure. More than likely, an outside vendor can also offer a greater variety of instruction formats and technologies. The outsourcing option can be flexible, running the gamut from contracting all your training programs to working jointly with the outside vendor to tailor your education plan modularly to match the style of your employees and your business environment.

In a recent survey, emphasis on education and training services was shown to exceed other priorities.



Source: Ledgeway/Dataquest, 1990, Professional Services and Systems Integration Market Trends. (N=500)

October 1991

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Grab a Great Deal on the DEClaser 1000

The DEClaser 1000 desktop laser printer has a lot going for it. It's compact and quiet. It's fast — printing four pages per minute. It's affordable, with prices starting at \$1,499. And right now, it comes with \$300 worth of supplies and accessories FREE!

That includes a large-capacity letter-size paper input tray, a box of 8 1/2" x 11" transparency sheets, and one 3.5-inch and one 5.25-inch Microsoft Windows

floppy diskette with MS-Windows V3.0 Driver for Digital printers — plus a handsome carry-bag for toting around.

This great deal applies to any of the three DEClaser 1000 printers — Basic Version LN07, PostScript Version LN07U, and Printing Services Version LN07R with VMS License. (Offer ends December 27, 1991. All trade-in and Digital business agreements apply.)

To order, or for more information on the features of our DEClaser 1000 printer family, call 800-DIGITAL (800-344-4825), ext. 715.

Monitoring Another Great Deal

The VRE01 18-inch flat-panel monitor is now specially priced at \$2,995 — while quantities

last. This space-saving monitor teams well with Digital's VAXstation workstations, DECstation 2100/3100 systems, and VT1200 terminals. (Price is set, with no further discounts or allowances.)

Good-Bye VT320 (Hello Savings)

Now is a good time to take advantage of the savings on soon-to-be-discontinued VT320 terminals. One VT320 is priced at \$359. Bulk quantities (210 per order) are priced at \$300 each. (These are set prices, with no further discounts or allowances.)

Digital's Fastest Disk Now Performs Better, Costs Less

Digital's recently announced 27% price reduction for its 120 MB, solid-state ESE20 disk brings the price to \$80,000 for a single unit.

This pricing move follows a 400% increase in performance offered through a product enhancement made last year.

The ESE20 is our fastest storage subsystem for high-performance VAX 6000 and VAX 9000 systems. Performance gains ranging from 25% to a factor of 10 result when an ESE20 replaces a magnetic disk in applications that require very fast I/O response, such as transaction processing, large population time-sharing, and I/O-intensive scientific analysis.

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Upgrade your VAX 8600 to a VAX 8650 system, and you can count on increasing system performance — at an attractive price, too. Benchmarks support performance claims:

- Single-User (running 52 programs)
Upgraded VAX 8650 performance was 1.42 to 1.54 times that of VAX 8600 system.
- CAEM Batch (running 40 programs)
Upgraded VAX 8650 performance was 1.44 to 1.48 times that of VAX 8600 system.
- Multiuser (running large, single program)
Upgraded VAX 8650 performance was 1.33 to 1.43 times VAX 8600 system. Peak throughput was 240 users on the VAX 8650 versus 168 users on the VAX 8600.

Prior to installation of the upgrade, an initial site audit is required to ensure that your VAX system can accept it. The upgrade package comes complete with a 90-day Digital warranty and is eligible for Digital on-site service.

VAX 8600-to-8650 Upgrade Kit
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As Lotus Development Corporation recently discovered, Digital's commitment to supporting the widest possible range of hardware, software, and networks translates into open support for customers.

Lotus also discovered how well Digital and Novell can join together to meet customer needs. Digital has been working with Novell Corporation to provide global support for its high-performance PC LAN software and client/server NetWare networking solutions. In fact, Digital network engineers are Novell-trained Certified NetWare Engineers.

Recently, Digital and Novell worked together to install NetWare on over 150 IBM PS/2 platforms at 15 Lotus Development Corporation sites throughout the U.S. and Canada. The entire effort, which included cable plant installations, hardware, and software, as well as customer orientation and system administrator training, was completely managed by Digital Desktop Services. One of the major benefits in using Digital was that Lotus had a single point of contact coordinating the installations, setup, and training.

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Digital and non-Digital products from the desktop to the datacenter . . . and the network connecting it all together. For more information, call 800-676-0876 today.

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October 1991

The Door to Data on Your IBM Mainframes Now Opens Faster and Further

The data's all there — sitting on your IBM mainframes. But all too often the complexity of multiple, dissimilar file transfer and data access products makes accessing that information difficult.

Maybe you've tried the Remote Job Entry (RJE) approach and found it a less than satisfactory solution. Transfers can be time consuming, job submissions are often limited, and users on both ends need to learn an IBM language.

Perhaps now's a good time to take a look at the new, enhanced version of Digital's Data Transfer Facility (DTF).

DTF Defined

Digital's DECnet/SNA Data Transfer Facility Version 3.0 is a layered software product that provides bidirectional file transfer capabilities between IBM's MVS and VM systems in an SNA environment *and* one or more Digital nodes in a DECnet environment.

Data transfers can be initiated by either environment. Supported Digital nodes include VMS, RSX, ULTRIX, MS-DOS, or OS/2 systems, all running DECnet. DTF V3.0 works over any of the DECnet/SNA transport products, such as DECnet/SNA Gateways or VMS/SNA. There are four components to DTF:

- VMS/DTF server software
- DTF for IBM MVS software
- DTF for IBM VM software
- DTF utilities.

The VMS DTF Server software is installed on a VAX system, and it communicates with the IBM component via a DECnet/SNA Gateway on the DECnet network or VMS/SNA.

By supporting multiple file types (such as CMS, VSAM and non-VSAM), DTF V3.0 allows easy applications development. It also translates complex data types transparently, and it allows users to select which systems support the translation of text files. This means you don't have to spend valuable time and money retraining users to learn a new system language.

What's New about V3.0?

We're committed to providing you with full Digital-to-IBM connectivity. The enhanced capabilities of this latest version of DTF strengthen that commitment in several ways:

- *Remote Job Submission*
DTF users can submit jobs remotely from all DECnet clients — and that includes VMS, RSX, ULTRIX, MS-DOS, and OS/2 systems.
- *Comprehensive, Bidirectional Access from All Supported Clients*
DTF V3.0 enables bidirectional file transfers between all DTF-supported nodes and IBM MVS and VM systems.

Thanks to the Newest Version of DTF

File Backup

DTF V3.0 allows VMS and ULTRIX users to target IBM disks and tapes for backup and restore operations. The capability greatly optimizes system resource usage in an IBM-Digital environment.

Post-Processing

Using DTF V3.0, Digital and IBM users alike can select a post-processing file to be executed after a file transfer is completed. You can logically connect the running of a batch job to the successful completion of a DTF file transfer — making the implementation of distributed processing functions easier to synchronize between IBM applications and DECnet-based applications.

Window to OSI

When used in conjunction with Digital's FTAM, DTF V3.0 enables SNA users to exchange files with other multivendor systems that support FTAM. This window to open systems computing works to preserve your investment in SNA software and applications.

Proven Recovery and Security Capabilities

In the event of a network failure, DTF V3.0 also provides checkpoint/recovery facilities that enable you to automatically restart a file transfer. Recovery can be initiated from either the Digital or IBM environment.

Security is always a key issue in an open computing environment. DTF V3.0 controls access and protects valuable data by supporting interfaces to industry-standard, IBM-based security packages, including CA-ACF2, RACF, and VMSECURE. For Digital systems, security is implemented through standard file protection mechanisms included in the base operating system.

Consider This Package Deal (and Save \$30,000 or More)

The new DECnet/SNA Integrated Information Access Packages conveniently and economically combine the DECnet/SNA Gateway-CT with DTF. In addition to the DECnet/SNA-CT hardware and software, the package contains the VMS/DTF server software and the DTF for IBM software (either MVS or VM). Note that in the packaged configurations, the DTF server software is CPU independent — meaning users can run DTF on any VAX VMS systems without incurring additional upgrade charges as computing needs grow. This way you get the components you need at substantial savings.

DECnet/SNA Integrated Information Access Packages

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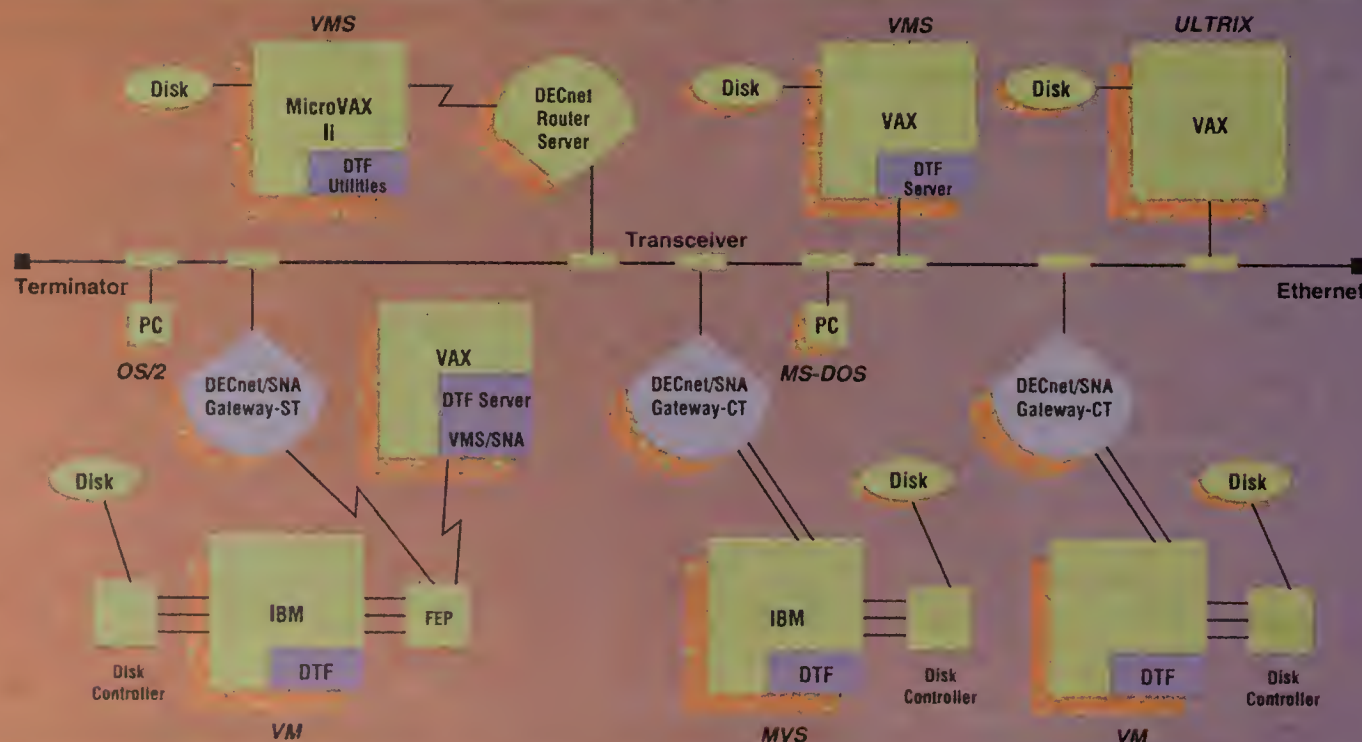
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\$60,000

For VM system software:

Order # DESNB-VM
\$50,000

For more information, talk to your Digital sales representative today. Or call 800-DIGITAL (800-344-4825), ext. 315. (And be sure to ask for your FREE copy of our 8-minute video detailing the features and benefits of DECnet/SNA DTF V3.0.)

Open Computing Is Here
DECnet/SNA DTF V3.0 provides a true network-to-network link between multiple operating systems and communications software. The results: critical data is more readily accessible, and your IBM investments are protected.



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INTEGRATION STRATEGIES

MANUFACTURING

Experts: Time to put it together

BY TONY BAER
SPECIAL TO CW

Just in time. Zero inventory. Total quality management. Fads in computer-integrated manufacturing (CIM) come and go, but CIM — and manufacturing computerization in general — continue to clack along. However, as U.S. manufacturers struggle with a variety of quick fixes and long-term strategies to boost competitiveness, there is a growing belief

that success will depend on re-engineering various processes and better integration of manufacturing technology with the rest of the business.

Manufacturing experts say it is crucial that information systems professionals understand the big and changing picture if they are to make meaningful contributions during the next few years. As manufacturing gets more mainstreamed, they say, IS will increasingly be called on to consult on and to steer various integration and re-engineering efforts in partnership with business teams.

Roger Willis, factory management systems director at Andersen Consulting in Chicago, says the big point is that factory computerization can no longer be viewed simply as a way to improve manufacturing processes. Instead, he says, manufacturing must

be seen as part of a strategic whole that helps a company get out the right products at the right time.

This means not only improving and linking systems but also rethinking them, eliminating products and processes that don't advance strategic aims. Manufacturing solutions must be business solutions, Willis says, not vice versa.

These improved, next-generation systems must also go beyond the four walls of the factory, adds Lee Wiley, head of Gartner Group, Inc.'s manufacturing service. He agrees that a plant should not be seen as an island unto itself but as a part of the overall business.

Wiley calls for a new generation of enterprise resource planning (ERP) systems that encompass not only traditional manufacturing resource planning (MRP) II systems but also plant-

floor scheduling and execution, total quality management, regulatory reporting, maintenance, marketing forecasts, sales-order management and distribution systems.

Only when companies begin to take this wider, integrated approach will significant, meaningful manufacturing gains be made, Wiley says.

Something has to improve.

After years of trying labor reduction, concurrent engineering, statistical quality control, material control and, more recently, time-based management and customer-based manufacturing, real gains have been slow in coming, according to Jeffrey Miller, a Boston University professor who heads the Manufacturing Roundtable, a Boston-based group that conducts semiannual manufacturing surveys.

The group's 1990 survey showed that while manufacturing quality has improved 7% annually, product lead times — which Miller today considers more crucial — have progressed at only half that rate. This allows Japanese automakers, for example, to still get new models to

Continued on page 68



David Povilaitis

GM truck plant keeps on linking

Since 1986, the company has added an ever-more-complex mix of computers, robots and 25 miles of conveyers

INTEGRATING MANUFACTURING

General Motors Corp.
Pontiac East
Assembly Plant

BY EMILY LEINFUSS
SPECIAL TO CW

Just as Henry Ford's assembly line broke work up into pieces for speed and efficiency, the integrated manufacturing systems at General Motors Corp.'s Pontiac East Assembly Plant have linked some of those pieces back together for the same reasons.

Over the last seven years, the facility, a division of GM's Truck & Bus operations in Pontiac, Mich., has evolved into one of the most integrated manufacturing plants in the U.S.

Company officials say every facet of plant operations is integrated on a broadband Ethernet, including order processing, vehicle production support, testing, build integrity, material

control and accounting. Some 63 different applications are built into five highly integrated architecture levels, which can help turn out one vehicle per minute, or 960 trucks per day.

But GM isn't done yet.

The world's largest automaker recently paired its technical staff with its Electronic Data Systems Corp. subsidiary on a new integration project. The team improved the Pontiac plant's maintenance system by installing a vision system that tracks both truck and carrier through assembly.

"Prior to this, we had to match the carrier to the vehicle manually and type both numbers into the system, which caused a lot of error," explains Gary Budzinski, account manager at Pontiac East for EDS, which serves as the location's information systems department.

Overall, says Ron Frizzell, plant production manager, integration is as crucial to the output of trucks as the assembly line was to older manufacturing businesses.

"With the complexity and size of this plant — including 2.4 million sq ft, 25 miles of conveyor and 146 robots and a lot of other automation —



Peter Yates

Frizzell: *It would not be possible to operate without systems integration*

it would not be possible to operate without high-level systems integration," he says.

Two IBM 4381 mainframes and four Digital Equipment Corp. VAX 8600 series systems top an impressive list of linked devices (see tech

specs, page 74).

GM's commitment is easy to understand: According to company officials, integrating information across functions at Pontiac East and installing plant-floor robotics has reduced

Continued on page 74

Experts: Time to put it together

Continued from page 67

market more quickly than Detroit.

In a sense, consultants say, manufacturing automators are coming to the same conclusions as peers in other parts of the enterprise regarding the importance of technology-to-technology and people-to-technology integration.

Time at a premium

Much of the current push for manufacturing integration stems from growing pressures to get products to market more quickly.

In the time-competitive market of the 1990s, consultants say, plant-floor workers, field representatives and others can't afford to waste time searching for, duplicating or re-keying information that already resides in applications or databases owned by other departments or company sites.

All personnel must be dedicated to getting products to customers as rapidly as possible, the current thinking goes, so as not to step over each other's feet.

There is also a renewed sense of urgency for keeping people involved in every stage of the manufacturing loop, from planning new systems through implementation and operation.

This represents a major shift from the early 1980s, when robotic, lights-out factories were considered the wave of the future.

Today, manufacturers and system sup-

pliers are realizing that it pays not only to involve people but also to provide them with better information, which allows them to perform more efficiently and add more value to products.

In fact, people issues outranked physical facilities 8 to 1 as key factors in the success of flexible manufacturing, according to more than 100 senior U.S. executives attending a recent industrial leadership conference in Boston.

The Manufacturing Leadership Summit concluded that improved customer satisfaction and the ability to present more products can only be accomplished by integrating systems, technology and people — with a strong emphasis on the latter.

This realization has already caused a number of companies to change how they automate and integrate manufacturing. In some organizations, "CIM teams" are gaining popularity.

This typically involves gathering representatives from plant floor to product design, plant management, sales and finance to hammer out blueprints and make the final selections.

Opinions vary about whether the growing urgency for manufacturing integration is increasing or decreasing the need for outside systems integrators to step in.

Tony Friscia, president of Advanced Manufacturing Research, Inc. in Cambridge, Mass., says that he sees demand

A systematic definition

For many years, the term "manufacturing systems" was synonymous with manufacturing resource planning (MRP) or MRP II. The latter added plant-floor routing, scheduling, work-in-progress tracking and financial functions to basic MRP.

Today, manufacturing systems can mean anything from MRP II to integrated process control, finite scheduling, computer-aided design and manufacturing or any other information solution designed to meet a manufacturer's needs.

It's part of a realization that competitiveness isn't assured just by synchronizing material movements and performing production accounting alone.

For instance, a regional maker of baked goods may require finite scheduling systems that juggle baking schedules for different types of bread, depending on current demand and plant capacity.

A manufacturer plagued with high scrap rates may require integrated process control or, in some cases, environmental tracking to report which processes are the most wasteful, not to mention polluting.

MRP II systems still have their purpose, however. A company seeking to cut lead times may look to MRP II systems to better synchronize the conversion of raw materials to finished goods.

TONY BAER

for strategic and tactical consulting growing, thanks to the complexities brought about by enterprise integration.

Friscia divides systems integration into business, manufacturing and plant-floor automation levels. According to his count, there are 15 or so "serious" players, including McKinsey & Co., the Big Six consulting/accounting firms and major hardware vendors in the business. The rest, according to Friscia, are subcontractors.

Outside help unnecessary?

On the other hand, Gartner Group's Wiley argues that the emergence of state-of-the-art, flexible systems, languages, tools and techniques — SQL databases, fourth-generation languages, computer-aided software engineering tools and configurable off-the-shelf applications — may eventually render outside integration help unnecessary.

He acknowledges that although rela-

tional databases handle data differently, it is not difficult to integrate the data once it is modeled.

Furthermore, Wiley says, manufacturers may wish to keep enterprise resource planning development in-house to preserve competitive advantage.

Companies downsizing corporate information or engineering staffs are more likely to rely on outside help from the software or hardware vendor or an independent systems integrator, according to experts.

Consultants advise that if an outside integrator is needed, it's important to determine if the problem involves business, systems or automation strategy.

Only then can the client select an integrator with the proper background and alliances with other integrators, as well as with hardware and software suppliers. •

Baer is a New York-based free-lance writer who specializes in manufacturing issues.

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Composites in Manufacturing & Tooling for Composites Exposition and Conference, Anaheim, Calif., Jan. 6-8, 1992 — Contact: SME (800) 733-4763

Uniform Conference, San Francisco, Jan. 21-23, 1992 — Contact: Pemco Management, Des Plaines, Ill. (708) 299-3131

Houstex Advanced Productivity Exposition, Houston, Jan. 28-30, 1992 — Contact: SME (800) 733-4763

Charlotte Advanced Productivity Exposition, Charlotte, N.C., March 10-12, 1992 — Contact: SME (800) 733-4763

ENE/Enterprise Networking Event — Exposition & Conference, Washington, D.C., March 16-19, 1992 — Contact: SME (800) 733-4763

Automated Manufacturing Show, Montreal, March 25-26, 1992 — Contact: Reed-MacGregor Exhibitions, Inc. (514) 328-8136

Automated Manufacturing '92 Exhibition & Conference, Greenville, S.C., April 7-9, 1992 — Contact: S.C. State Board for Technical & Comprehensive Education (803) 737-9354

Autofact '92 Exposition & Conference, Detroit, Nov. 9-12, 1992 — Contact: SME (800) 733-4763



Paths to manufacturing integration

There isn't one right way to connect manufacturing systems. Here is a look at several winning strategies

Everyone agrees that manufacturing systems must be better integrated with other applications and the rest of the enterprise. But no single approach will work for every manufacturing organization. So *Computerworld* asked free-lance writer Tony Baer to look at the integration strategies being pursued by several different companies.

Client/server anchors paperless approach at Raychem

Raychem Corp.'s Advanter plant near Vancouver, British Columbia, needed to develop a fast, economical system for making aerospace wiring harnesses — highly variable components typically ordered in small lots.

The solution was a paperless manufacturing system based on client/server technology that linked business, product design and computer numerical control systems. Four Sun Microsystems, Inc. workstation servers and six plant-floor X Window System terminals are linked via Ethernet.

The systems integration team included two Raychem systems engineers — one for computer-aided design and manufacturing (CAD/CAM) and the other for manufacturing resource planning (MRP) II — an in-house numerical control programmer and a software engineer from Cimlinc, Inc., a CAD/CAM supplier.

Cimlinc developed an automated production documentation system and the interface between CAD and CAM. Many of the system's features were specified as the project progressed, says Greg Smith, the Raychem manufacturing systems engineer who handled CAD integration.

For instance, once the client/server architecture was designed, it seemed logical to use a rule-based system to generate design and manufacturing specifications from a traditional design archive.

Another innovation was tracking setup times and scrap, which required Smith to write a C program to automatically feed operations data back to the MRP II database.

Burroughs-Wellcome: IBM gets the nod for systems integration

When Burroughs-Wellcome Co.'s new plant, now under construction in Greenville, N.C., opens in 1993, it will include the latest in automated process control, material transport and distribution.

The pharmaceutical maker assembled a project team, which produced overall specifications and chose the vendors.

IBM was selected as the prime

systems integrator because of its offering of Process Operations Management System (POMS), a software application that manages plant-floor operations, according to Gabriel Cipau, Burroughs' senior vice president of production engineering.

Burroughs committed to the project 12 full-time people from information systems, manufacturing, engineering and finance, who worked in adjoining quarters with the IBM site team. To keep efforts on track, their activities were supplemented by weekly meetings involving both firms.

"It's necessary to have a clear picture of what you want and how you plan to run your systems before you bring in an outside vendor," especially because the systems portion of such a project is substantial, Cipau ad-

vises. Systems comprised 15% of the new plant's overall cost.

Cipau and staff learned these lessons from an earlier project, when an adjoining Burroughs plant served as a beta-test site for a new IBM repository system for Food and Drug Administration manufacturing validation documents, a system that went on line earlier this year.

The new plant, currently about 30% complete, is scheduled to go on line in early 1993.

It will include an IBM mainframe Enterprise System/9000, IBM 7651 industrial personal computers, IBM Personal System/2s, a Digital Equipment Corp. VAX for plant supervisory control, device controllers from Texas Instruments, Inc., Allen-Bradley Co. and Modicon, Inc.; data collection systems from Intermec Corp.; and material handling systems from Manneberg-Demag.

Software applications include IBM's COPICS MRP II and POMS.

ing, screening, bleaching, drying and paper machines that must be fed continuously.

Danforth says engineers also improved the control system supplier's settings by devising a computerized, supervisory control system that continuously adjusted digester steam valves based on digester steam pressure readings.

The plant uses an IBM 3090 mainframe (for business processing and process optimization) to reduce material and energy waste, the two biggest operating costs.

Company officials say the project paid for itself in a year.

MRP II makes a difference at Marley Cooling

At Marley Cooling Tower Co. in Olethe, Kan., the leading supplier of industrial cooling towers for manufacturers, the company needed to regear

to regain sliding market share. The goals were cutting inventory costs and lead times while boosting quality, explains Phil Hendrickson, plant manager.

Marley needed current information so it could keep better track of operations in four plants scattered across the U.S. The firm's homegrown IBM-based system couldn't provide the necessary timely reports because it was batch updated only weekly.

This time around, Hendrickson says, Marley decided to buy off-the-shelf software because its IS department, which was being downsized by a third, didn't have the manpower to devise, upgrade and document a new system.

Dun & Bradstreet Software's AMAPS was selected because it would run on the firm's existing IBM mainframe.

By 1989, the firm decided to replace an order system with a new package from United Consulting Services, a Milwaukee-based systems integrator that customized the software to Marley's specifications and integrated it with AMAPS.

According to Hendrickson, the company decided to have United Consulting perform the integration because it wanted fresh ideas.

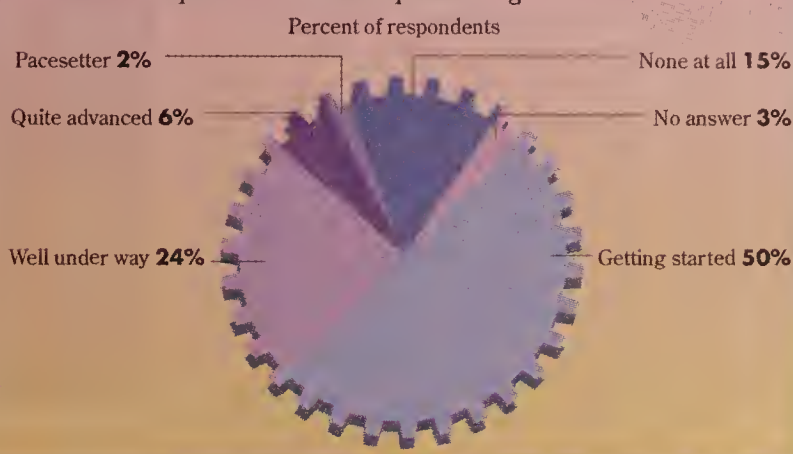
The tactic worked: Both procedures and internal attitudes began changing, he says.

For instance, the differing bills of materials (which list subcomponents of raw materials comprising the final product) from production, finance and engineering were consolidated, with engineering taking the lead.

"If nothing else, the biggest thing we got out of the project was teamwork," Hendrickson says. •

CIM's progress

Where do companies stand on implementing CIM?



1990 Industry Week survey

An off-the-shelf solution works for Georgia Pacific

At Georgia-Pacific Corp.'s Brunswick, Ga.-based pulp and paper bleaching plant, one of the world's largest, the integration solution was to buy off-the-shelf control systems from Honeywell Industrial Automation in Phoenix. Despite its off-the-shelf approach, the plant used in-house staff members — including five process engineers and two IS programmers — to continually refine its systems.

"Anything that's written generically will never account for all of the idiosyncrasies in your equipment," says Hazen Danforth, process engineering and control superintendent, who adds that in-house personnel are the best suited for performing the fine-tuning.

One of the key projects was retuning the controls on the digesters — units that run in batch mode — to better synchronize with wash-

Integrating manufacturing: priorities

What CIM strategies will you emphasize over the next few years?

Percent of respondents Multiple responses allowed			
Bar coding/Automated data collection	62%	Computer-aided engineering (CAE)	36%
Computer-aided design (CAD)	57%	Electronic data interchange (EDI)	33%
Computer-aided manufacturing (CAM)	57%	Area or plant networks for equipment control/Feedback	32%
MRP or MRP II	56%	Automated testing/Inspection	31%
Computer-supported SPC/Quality control	51%	Engineering data management	31%
Companywide networks for information sharing	47%	Computer-aided process planning (CAPP)	28%
Linking CAD to CAM	41%	Robotics	22%
Computer numerical control (CNC)	37%	Flexible manufacturing systems (FMS)	22%

Source: 1990 Industry Week survey

CW Chart by: Tom Monahan

Navistar rolls out new fiber network

Goal is to give shop-floor workers timely information to make 'better trucks the first time around'

INTEGRATING MANUFACTURING

Navistar
International
Transportation
Corp.

BY ARIELLE EMMETT

A push for better quality and new ways to build a redesigned truck fleet has driven Navistar International Transportation Corp. to take the leap into fiber optics with its new manufacturing network.

Since early this year, the nation's biggest maker of medium and heavy trucks has used a 12.3-mile fiber network to unite some 500 users in 15 buildings in and around its Springfield, Ohio, assembly plant. "For the first time, we have timely and specific data delivered to the shop floor," says Terry S. Kline, manager of technical services. Previously, information was delivered to factory workers on paper, if at all.

Chicago-based Navistar, a \$4.5 billion company that sells under the international tag, has led the U.S. in non-light truck sales for the past decade. But like other transportation manufacturers, it has been hurt by the continuing slowdown in sales. So since 1987, the company has set out to revitalize flagging profits by redesigning nearly all of its truck line, introducing 25 new models in 1989 alone.

Now Navistar is banking on the belief that bringing leading-edge engineering, warranty, assembly and management applications to the assembly line and other previously isolated groups will ultimately help workers build better trucks the first time around, thus boosting sales and profits. It has also begun a related \$4 million database integration effort.

"In the past, paper-based data reports conflicted, and our assemblers had a dilemma over which was the most current data available," Kline explains. "Errors cost us millions in repairs, as well as trucks that couldn't be shipped out immediately. [Now,] we're trying to give our assembly men more control over their data."

Installation of the Fiber Distributed Data Interface was completed in March. The four-month, \$1.2 million project was coordinated by integrators from Digital Equipment Corp. and used network concentrators from Chipcom, Inc. in Waltham, Mass.

Among the other benefits Navistar said it expects from the fault-tolerant network are reduced clerical errors, more cost-effective manufacturing and less investment in network peripherals. Company officials expect a \$1 million payback within the year.

"The fiber network has already saved us a quarter million in deferred

network costs, such as the \$30,000 monthly costs of modems and leased lines," Kline says. The network now operates at 10M bit/sec., but later this year, it will reach 100M bit/sec., so savings should increase even more.

Long time coming

Navistar mulled over the need for integration for several years before acting, according to Edward Meyer, business applications manager of the Springfield Navistar Information Organization, which spearheaded the project.

Meyer says paper-based systems caused duplication and confusion, which made workers at its 1.5 million-sq-ft facility more prone to subassembly errors. Among the problems were redundancies in parts lists, reports on critical inspection items and "line settings," which mandate the order in which trucks are assembled.

A change in an assembly specification or schedule, for example, meant that "runners" had to redistribute new tickets to as many as 200 shop-floor sites. In addition, assembly workers sometimes received similar — but not identical — updates from different departments. "The guy sitting on the line gets all these paper updates and then has the dilemma of deciding which is right," Kline explains.

Kline says that planners knew the solution was an integrated system that would give assemblers instant access to important current data. But management was not convinced, until manufacturing efficiency studies indicated the company would fall far short of productivity and quality goals unless operations were fully integrated.

Soon after, the company developed a two-pronged strategy: First, find a network that could economically deliver both engineering and assembly information directly to factory floor workers in Springfield and other locations. Second, integrate existing, diversified data systems, including a "master" ticket system generated on a corporate IBM 3090 mainframe located in Brookfield, Wis., and a separate engineering design database generated in Fort Wayne, Ind.

Navistar had already made consid-

erable "bits and pieces" investments in various networks and computers. A few applications were hard-wired to the plant floor, and a baseband network linked the Ohio plant to the Fort Wayne engineering facility, Kline recalls.

"But we couldn't keep buying bits and pieces," he says, "because each time we put in a new project, [automation costs] were too expensive. It just wasn't an efficient way to go."

Broadband recommendation

In October 1990, Navistar took DEC's recommendation to use broadband fiber. The high bandwidth, lower maintenance and better noise tol-

the threshold."

However, there's no turning back now; several new short- and long-term applications projects sparked by the network are already under way.

For instance, a new track application lets assembly operators more efficiently schedule and track truck cab manufacturing. New inventory, barcode and time-and-attendance applications have also been implemented. In fact, the fiber network is even used to run an environmental monitoring application at the Springfield facility's waste water treatment plant.

Long-term investment

For the long term, Navistar is investing \$4 million to automate its paper-based systems and to integrate multiple databases. At present, DB2 manufacturing data is being moved off the Brookfield IBM 3090 mainframe onto a cluster of VAX 6510s in Springfield. Eventually, data sets will be integrated into DEC's RDB, with a Focus fourth-generation query language to manipulate data via screen reports, Kline says.

The goal is to create a centralized manufacturing database, updated in real time and distributed to the shop floor electronically. This will mean that engineering releases, assembly drawings, parts broadcast information, manpower assignments, tooling and fixturing, statistical process control and other applications will be gathered up for translation into Navistar's universal manufacturing database.

Full images of assembly drawings will be broadcast over the network so that assembly workers can access them in real time as the truck reaches their stations. The long-term vision also includes transmitting live-motion video of assembly drawings, kinematic analyses, etc., as well as the transfer of large-scale graphical images of subassembly drawings.

The database will also provide indirect linkage to a separate Unigraphics Corp. database with three-dimensional engineering data. This will allow any assembler to instantly call up an engineering drawing image on a terminal. Engineering, management and plant-floor work groups will eventually be linked.

By the end of 1992, Kline says, Navistar plans to have line-set tickets, essential parts lists and truck componentry completely automated on the network. For now, hard-wired computer-integrated manufacturing applications are supported on the plant floor. That, too, will change.

"The bottom line is that we'll be able to build trucks right the first time," Kline concludes. "Building them 'not right' is too expensive." •

Emmett is a free-lance writer based in Hewitt, N.J.



Navistar says its new FDDI network will have a \$1 million annual payback

erance as well as an expected 20-year lifespan were key factors.

In Springfield, three major installations were fibered together: the assembly plant, body plant and paint facility, as well as several other buildings. The network also links to Fort Wayne and other Navistar facilities through the company's network of T1s.

The network uses a three-tiered system of distribution points (e.g., hubs), including a master wiring hub, numerous intermediate hubs and lower level intermediate distribution frames. These are installed with two separate transmission paths across the factory floor to avoid worst-case disasters, such as cable cuts.

The fiber-optic network uses 68 Chipcom Online System Concentrators and eight local-area network bridges from DEC. The latter isolate production-critical segments from the nonproduction functions to assure maximum network uptime, according to Kline.

The switch from paper to on-line systems has been well received by most of the assemblers, supervisors and managers, Kline says. But he acknowledges that "cultural change is a reality with these systems. Some people have a hard time getting over

CLOSE-UP

Company: Navistar International Transportation Corp.

Goal: Reduce production errors, link functions in main Springfield, Ohio, assembly plant, reduce networking costs.

Strategy: Install 12.3-mile broadband fiber-optic network to unite approximately 500 users in 15 buildings.

Payoff: Reduced clerical errors, more cost-effective manufacturing, expected \$1 million annual savings in deferred network costs.

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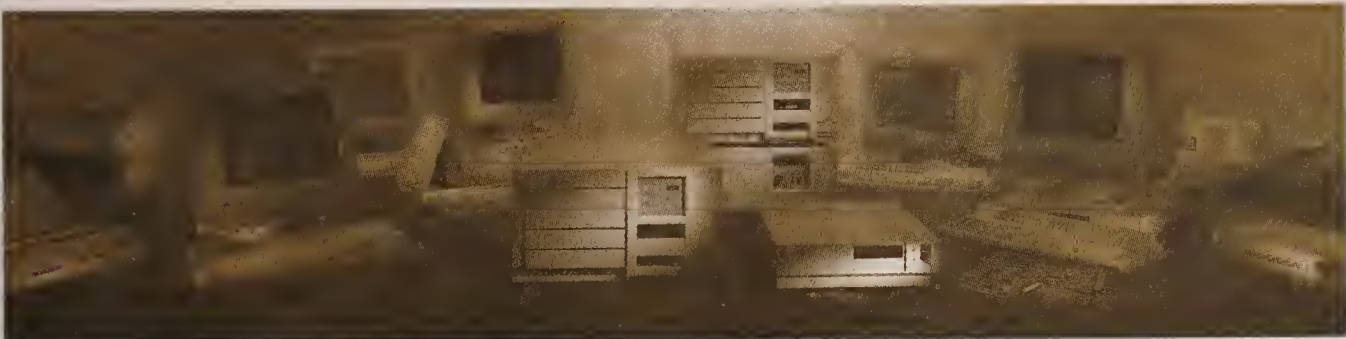
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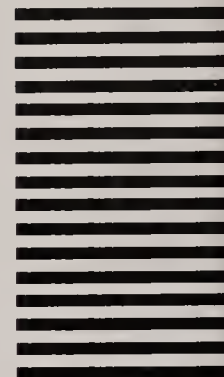
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GM truck plant keeps on linking

Continued from page 67

assembly time, automated maintenance methods, created more reliable and trackable shipping procedures and cut errors.

It has also allowed the plant to adopt just-in-time methods to cut inventory and provide plant floor personnel with better and faster information about their assembly product, according to GM.

For example, Frizzell says, "Our seat supplier is on line with our systems through modem. The seats are installed two hours after we broadcast" to the supplier. Also, many other suppliers communicate with the plant's material scheduler to make up their schedules according to

Pontiac's needs. Shipping has also been sped up, company officials say.

Fast start

Planning for plantwide integration began in late 1984, shortly after GM acquired EDS. The plant was completely shut down in 1985 to make way for all the new computers and other equipment. With input from GM's corporate information management group, GM and EDS got the plant up to full line speed by December 1986. Four other GM plants were also automated during the same period.

A carefully planned architecture linked a GM information processing center in

Plano, Texas, plant/host systems, area management, cell controllers and plant-level devices. The plant was one of the first and largest users of the Manufacturing Automation Protocol, which allows different devices to be hooked together.

Today, as soon as the plant's sales and marketing division knows what vehicles to build, floor workers get the specifications. Those specs include the hour the vehicle will come out of the body shop, the options and the end destination, right down to the correct parking space for the delivery trucks at the railroad yard.

"The information on the vehicle is available the precise moment and place it is needed. That is a great advantage from a quality, speed and inventory perspective," Budzinski says.

Integration also helped step up vehicle manufacturing time from 45 to 60 trucks per hour, GM says. "The only way to build trucks this fast is through automation," Budzinski says.

On the plant floor, the body shop and the paint shop function nearly 100% through robotics. Many of the 146 robots are intelligent because of information they get from the larger computer systems. Some are fully integrated; high costs prevent all from being so.

Before automation, shipping was a highly manual, paper-intensive, error-filled process. Automation reduced shipping scheduling from 10 steps to eight, according to Budzinski, and boosted the reliability of tracking where the trucks end up. Now, the manufacturing system knows where the dealer order came from and sets up the optimized way of getting the vehicle to the destination.

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Integrated eyes

Automated plant maintenance was another key concern of the integration efforts, Frizzell says. Because of its size, the factory floor has many "lights-out" areas. If a conveyor fails, there is no one on hand to sound an alarm. Thus, the entire factory is monitored from one central point, dubbed "mission control."

By using specialized hardware, fiber optics and broadband Ethernet, skilled tradespeople using terminals keep an eye on 1,000 different points, Frizzell says.

Besides assisting in the initial setup, EDS was also charged with migrating older GM systems, networking and integrating third-party products.

The system, while mature, is constantly being expanded and tweaked to further improve operations and cut down on errors, Pontiac officials say.

Despite the usual problems, GM officials say they are happy.

"What we see . . . is an integrated system that lets us communicate with all areas of the plant and with our suppliers," Frizzell says. •

Leinfuss is a free-lance writer based in Sarasota, Fla.



► Pontiac East's highly integrated manufacturing operations include two IBM 4381 mainframes, two Digital Equipment Corp. VAX 8600s, two VAX 8650s, 24 Hewlett-Packard Co. cell controllers that act as gateways between the main systems and the automated processors on the plant floor, 513 in-plant terminals, 277 printers for offices and the shop floor, nine other microcomputers, 120 personal computers and 638 communications network devices.

For production on the plant floor, the facility runs 300 programmable controllers, 146 robots, six vision control units, with more than 120 smart-eye readers, and 180 weld timers.

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Logan says 'I can' to paperless automation

Small aluminum company cuts reporting time from two weeks to two hours by linking DEC and IBM systems

INTEGRATING MANUFACTURING

Logan
Aluminum, Inc.

BY JILL VITIELLO
SPECIAL TO CW

Like the Biblical David, Logan Aluminum, Inc. relies on wits, speed and the best available technology to battle the industry's three Goliaths: Aluminum Company of America (Alcoa), Reynolds Aluminum and Chemical Corp. and Kaiser Technology Ltd.

Based in tiny Russellville, Ky., Logan has only one plant, 750 employees and an information systems staff of 24. But the company, which supplies \$700 million of rolled aluminum each year to Atlantic Richfield Co. and Alcan Aluminum Ltd., its owners, uses integrated state-of-the-art manufacturing and management systems to stay competitive.

For example, Logan recently integrated its Digital Equipment Corp. VAX 4000 and Modcomp, Inc. manufacturing minicomputers with an IBM Enterprise System/9000 and an IBM 3090 Model 120S used for business applications. As a result, the company was able to automate time-consuming data collection and analysis that previously had been done manually.

"Metallurgists working with spreadsheets, a calculator and a PC needed two weeks to make critical analyses," says Daryl Simpson, Logan's manager of IS.

Technicians gathered minicomputer data, reentered it onto the personal computer, then ran statistical analysis programs to generate reports and graphs. "There was no way we could compete effectively using an outdated paper trail," Simpson says.

Today, no PCs are used to generate those reports. Instead, metallurgists using minicomputer terminals

connect to an IBM Application System/400 database that acts as a central information repository. The linkage is done through IBM's CICS, which treats the DEC and Modcomp process computers like mainframe terminals. The shop-floor/production systems software was developed by internal programmers.

The result? Key reports are completed in two hours rather than two weeks, the company says.

Polishing up for market

Logan has a special interest in using manufacturing integration to prove its abilities: The company is operating under a government consent decree until it is eligible to be sold in 1995. As a result, Logan managers want to prove their firm's worth so that the company can command top dollar from a potential buyer.

Because Logan's plant — the first aluminum rolling mill constructed in the U.S. in 25 years — is less than a decade old, it was already highly automated. Even so, there was room for improvement.

The DEC and Modcomp computers are key components in controlling the machinery that churns out 45 million pounds of aluminum "coils" each month. These are eventually sold and turned into beverage cans.

The computers generate important data about aluminum making its way through the mill. Information on the metal's temperature, thickness, surface quality and other characteristics is collected by technicians using various electronic devices.

Along with the IBM Enterprise System/9000 running MVS/ESA, the process control computers are linked to a single AS/400 database via a Supra database from Cincom Systems, Inc. This off-the-shelf package lets users do advanced statistical analyses, graphical data presentations and ad hoc queries.

The system's two dozen or so users are mostly metallurgists, engineers and chemists, so ease of use was a key goal. A team of four IS workers and automation group workers redesigned the generic AS/400 front end. Working with a contractor,



Rhea Rippey

Logan's Simpson: Integration lets the company test and analyze new processing techniques almost as quickly as engineers can conceive ideas

Executive Information Services Corp. in Orlando, Fla., they spent six man-months devising menus, prompts and other ease-of-use features so that end users would not have to learn the AS/400 language.

Quality also improves

Besides faster reports, other payoffs are improved quality and increased market responsiveness, according to Simpson.

"Because the integrated manufacturing system transmits and receives data between the mill computers and the business computers in real time," he explains, "technicians and engineers know the exact parameters on the mill while the aluminum is being rolled."

This immediate, ongoing feedback helps the company make adjustments as problems occur, Simpson says. It also permits speedier correction and prevention of flaws such as streaking or stained metal.

Since the system was installed, company surveys show that 80% of customers have consistently ranked Logan as the top supplier of rolled aluminum, Simpson says.

In addition, the company can now test and analyze new processing tech-

nology almost as quickly as engineers can conceive the ideas, he adds.

For example, if an engineer wants to alter the milling process to ensure a smoother metal surface, he can adjust the process control computers, begin the milling and collect data on the results as the process progresses. If the results are positive, processing continues. If the results are negative, the process can be halted quickly before materials are wasted.

According to Simpson, the integrated system has been so popular that work is under way to design and install a second generation of the AS/400 software, which will include IBM's AS/400 version of windowing software. The idea is to improve users' performance by speeding up their work and allowing them to simultaneously view more than one chunk of on-screen information.

The program is also being rewritten to accommodate extra rolling machinery that will be added when a construction project intended to double plant size is completed.

Finally, Logan soon plans to migrate the system over to DB2. •

Vitiello is a speech writer and free-lance writer based in East Brunswick, N.J.



PRODUCTS/SERVICES

Cambridge, Mass.-based **Lotus Development Corp.** is shipping **Factory Bundle**, software for computer-integrated manufacturing. According to the company, the product integrates Lotus Factory, a 1-2-3 add-in that enables automatic and real-time communications between the spreadsheet and plant floor devices, and 1-2-3 for DOS Release 2.3,

a graphical spreadsheet.

Cimcorp Factory Controls, Inc. and **Digital Equipment Corp.** signed a distribution and consulting agreement designed to provide customers with one central contract for manufacturing systems integration services. The agreement lets DEC sell and support Cimcell and Cimcenter, Cimcorp's cell control and factory-floor management software.

Aries Technology, Inc. in Lowell, Mass., and **Pioneer Engineering and Manufacturing Co.** in Warren, Mich., are jointly marketing professional services to help manufacturing firms integrate advanced manufacturing computer-aided en-

gineering capabilities into their design and manufacturing processes.

Concord Communications, Inc. in Marlboro, Mass., and **FTP Software, Inc.** in Wakefield, Mass., announced Mapware controllers and PC/TCP, respectively, to provide concurrent Open System Interconnect and Transmission Control Protocol/Internet Protocol (TCP/IP) communications on a single personal computer. The products, aimed at manufacturers, also represent TCP/IP communications over 802.4 broadband local-area networks.

CONTRACTS

Electronic Data Systems Corp.

recently landed a 10-year, \$34 million information technology agreement to provide **PPG Industries, Inc.** with computer operations services. PPG has nearly 100 manufacturing facilities worldwide and manufactures flat glass, fiberglass, architectural finishes and industrial and specialty chemicals, among other things. Dallas-based **EDS** also completed acquisition of **SD-Scicon**, a European manufacturing software developer/supplier.

Doosan Glass Co., the largest glass manufacturer in Korea, recently installed a CIM system at its plant in Kunsan, Korea. **Digital Equipment Korea** was the prime contractor for the \$375,000 project.

Open systems slowly gaining steam in factory

BY TONY BAER
SPECIAL TO CW

The open systems issue is alive in manufacturing, too.

The big question is this: Are open systems needed to have a truly integrated manufacturing enterprise?

Definitely, says Lee Wiley, head of Gartner Group, Inc.'s manufacturing service in Stamford, Conn. Open systems, according to Wiley, are a major prerequisite for the future generation of enterprise resource planning systems.

A growing number of analysts

say they believe that the reduced instruction set computing (RISC)-based workstations will help Unix become more popular on the plant floor by 1995 or so.

Unix shipments in manufacturing are growing about 27% annually, according to Automation Research Corp. in Medfield,

Mass. The biggest growth has been in manufacturing resource planning II (42%), process optimization (34%), document management and operator console (both 32%), the firm says.

Some firms are confronting the issue by standardizing their computer-integrated manufac-

turing architectures. For instance, Kraft General Foods, Inc. in White Plains, N.Y., has decided to standardize all future process control systems in its food processing plants on Unix.

Specifically, the company will be using Hewlett-Packard Co. 9000 Unix supervisory computers and Texas Instruments, Inc. and Allen-Bradley Co. programmable logic controllers, which in turn will run PMIS, a supervisory control package from Bradley Ward, Inc. in Atlanta.

Manufacturing has a head start on the rest of the enterprise when it comes to Unix, experts say, thanks to its base in engineering. But open systems mean more than Unix, they note. Just because different software applications may already be ported to Unix, they caution, they won't necessarily be able to feed data or communicate with each other.

To deal with this problem, IBM, Digital Equipment Corp. and HP, along with several major software vendors, are developing new interfaces, often called "enablers."

At minimum, these enablers provide common data formats and communications protocols that allow applications to share data. In some cases, these enablers may also involve real-time databases that are intended as intermediate repositories for current plant-floor data before it is archived.

No special treatment

The key, says Roger Willis, factory management systems director at Andersen Consulting in Chicago, is avoiding the need to write custom interfaces between applications. "Every factory is organized differently," he says. "If you build application modules on top of enablers and tool sets, you're in a far better position to build a solution."

But the concept of enablers is still a bit ahead of the market, says Tony Friscia, president of Advanced Manufacturing Research, Inc. in Cambridge, Mass.

The challenge to manufacturers today, he says, is building the necessary SQL relational databases as foundations, then deciding how manufacturing information is going to flow.

Meanwhile, vendors continue to pursue Unix on other fronts. DEC, for example, joined forces with Cimcorp Factory Controls, Inc. as part of the Maynard, Mass., firm's new Ultrix in Manufacturing Program.

Cimcorp will provide its Cimcenter factory-floor management application, which operates on DEC's VAX and Ultrix computers.

DEC, whose popular VAX series now dominates the factory floor, announced in May a Unix-oriented manufacturing program, which includes products and applications for the company's RISC/Ultrix systems. •

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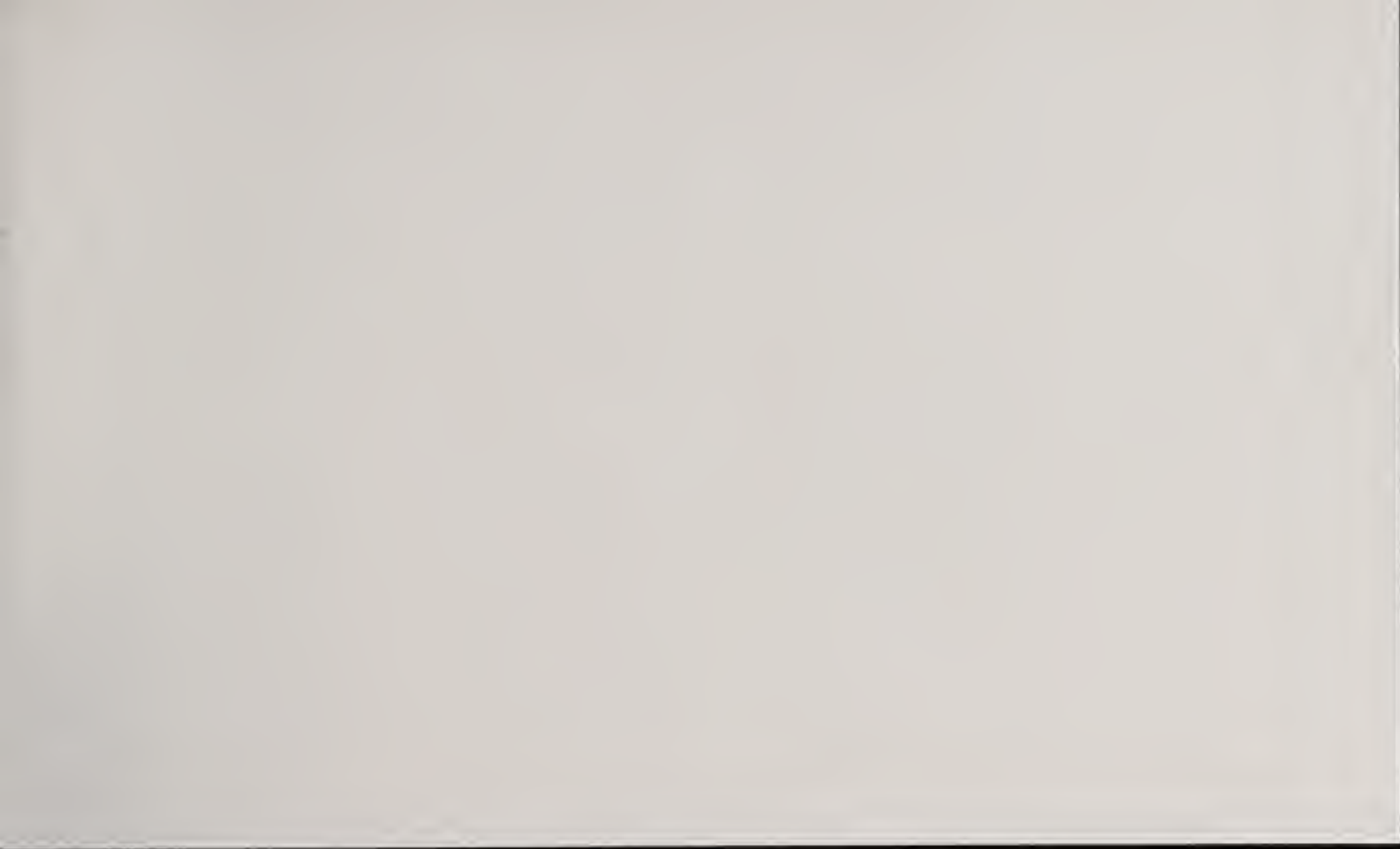
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Michael A. Hawotte

CIM today, tomorrow



In the global battle for manufacturing excellence, manufacturers are failing to recognize the role of computer-integrated manufacturing (CIM) as an integral part of business strategy.

Factory automation has stagnated from confusion, lack of vision, lack of com-

mitment, capital requirements and a scarcity of real expertise spanning both manufacturing and systems. These problems are common to U.S., European and Asian markets alike. Perhaps the biggest barrier is the absence of success stories from firms that have integrated existing manufacturing hardware and software. This lack of knowledge has resulted in thousands of CIM islands that ignore the value of a fully integrated system.

Commitment to integrating CIM varies greatly from continent to continent. Europe's commitment to CIM is by far the strongest, beating both the U.S. and Japan. Within Europe, Germany leads the pack, ahead of France and Great Britain. While the U.S. lags behind significantly, it is expected to increase CIM investments at a faster rate than both Europe and Japan.

For most companies, the question is not whether to implement CIM but how

and where. U.S. and Japanese firms tend to address problems first at the shop floor level, and then they do a full system analysis. Most European companies look at the whole system first before looking at processes and departmental functions.

These approaches have resulted in different integration priorities for manufacturing hardware and software among industries and nations. In Europe, the goal is to secure a competitive advantage, even without short-term economic justification. In contrast, Japan implements CIM technology only when it is economically justifiable. The U.S. focuses on short-term success rather than long-term manufacturing strategy.

How does the degree of utilization and integration among industries and nations compare? Europe and Japan have similar values for CIM applications in the automotive, machinery and electrical/electronic industries. These types of industries are ideal for CIM applications,

thanks to the type of products produced and mode of production.

In the U.S., the electrical/electronics, machinery and steel industries are leaders, showing a distinctively higher degree of CIM use than Japan. Not surprisingly, the U.S. automotive supplier industry is lagging far behind.

A look at the future of CIM promises a consolidation of CIM modules — computer-aided design and manufacturing and materials resource planning, which will be replaced by new modules. Despite the present shortcomings, the global commitment to CIM will continue. The substantial planned expenditures for the 1990s guarantee that CIM will profoundly affect the way the world manufactures tomorrow.

It's only a matter of time. •

Hawotte directs the systems integration practice of the Information Technology Services at A. T. Kearney, Inc.

Japan edges past U.S. in MAP implementation race

BY WAYNE ECKERSON
and BOB WALLACE
SPECIAL TO CW

The Manufacturing Automation Protocol (MAP) was developed in the U.S. and was designed to give U.S. manufacturers a competitive edge in the global marketplace. But ironically, according to industry watchers, the Japanese are taking the lead in implementing MAP.

Japanese companies, which have made an art of beating U.S. companies with American ideas and initiatives, are now embracing MAP as the best way to further integrate and boost efficiency of their already productive factories.

In contrast, while many U.S. manufacturers pay lip service to MAP, most have not implemented the standard. Common criticisms are that MAP products are too expensive and that existing network products better meet their requirements.

In fact, more than 70% of the known U.S. MAP implementations are within plants owned by General Motors Corp., which developed the protocol in the late 1970s (see story page 67).

Mike Kaminski, widely regarded as the father of MAP and a manager of computer-integrated manufacturing (CIM) technology with GM's Advanced Engineering staff in Warren, Mich., puts it bluntly. "The U.S. has lost the lead to Japan in implementing MAP," he says.

Charles Gardner, director of information technology infrastructure at Eastman Kodak Co., agrees that the Japanese have eagerly embraced MAP. "Once they decide on a plan of attack, you'd best get out of their way," says Gardner, a former chairman of the U.S. MAP/TOP Users Group and the World Federation of MAP/TOP Users Group.

Most observers acknowledge their opinions are based on a variety of subjective factors, such as observations made while touring large Japanese manufactur-

ing plants, attending Japanese CIM trade shows or talking to Japanese representatives. There is little hard evidence.

Even the Japanese aren't sure about the penetration of MAP within their country. Hideyuki Hayashi, secretary of the Japan MAP Users Group and executive director of the International Robotics and Factory Automation Center in Tokyo, says there may be more than 20 Japanese firms implementing MAP. The U.S. has an estimated 17 MAP sites.

Nearly everyone, however, agrees there is greater momentum for implementing MAP in Japan than in the U.S. or Europe. "There is a general consensus that Japan is more rapidly adopting MAP," says Andrew McMillan, chairman of the World Federation of MAP/TOP Users Groups.

Interest in MAP in Japan is said to be highest in the automobile, machine tool and electric utility industries.

According to most observers, Japanese CIM vendors are leading the charge for MAP. However, Japan's government has also played a role. This backing has galvanized Japanese CIM suppliers to develop MAP products and aggressively promote MAP use.

Users and vendors agree that one key reason why the U.S.' early momentum behind MAP may have slowed was the incompatibilities between MAP 2.1 and 3.0. They say changes in the standard were difficult for users to handle.

Whether the Japanese will take an insurmountable lead in the MAP arena and translate MAP support into a significant competitive advantage is difficult to tell at this point.

According to observers, given Japan's manufacturing prowess, U.S. manufacturers would certainly be wise to reexamine their commitment to open systems on the factory floor. •

Eckerson and Wallace are senior editors at *Network World*.



For more information . . .

GROUPS AND ASSOCIATIONS

Automotive Industry Action Group, Southfield, Mich. (313) 358-3570

Computer Aided Manufacturing-International, Inc., Arlington, Texas (817) 860-1654

Society of Manufacturing Engineers, Dearborn, Mich. (313) 271-1500

CENTERS

The Center for Integrated Manufacturing Decision Systems, The Robotics Institute, Carnegie Mellon University, Pittsburgh, Pa. (412) 268-2000

The Computer Integrated Manufacturing Center at Washington University's School of Engineering & Applied Science/School of Technology & Information Management, St. Louis, Mo. (314) 726-4444

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Cimdata, Wellesley, Mass. (617) 235-4124

Cimtek, Inc., Johnson City, Tenn. (615) 929-9383

D. H. Brown Associates, Inc., Tarrytown, N.Y. (914) 631-7859

Daratech, Inc., Cambridge, Mass. (617) 354-2339

Dataquest, Inc., San Jose, Calif. (408) 437-8000

Gartner Group, Inc., Stamford, Conn. (203) 964-0096

International Data Corp., Framingham,

Mass. (508) 872-8200

Killen & Associates, Palo Alto, Calif. (415) 323-3857

Strategic Focus, Milpitas, Calif. (408) 942-1500

The Yankee Group, Boston, Mass. (617) 367-1000

PUBLICATIONS AND REPORTS

AI Expert Magazine, Miller Freeman Publications, San Francisco, Calif. (415) 397-1881

"Annual Survey of North American Manufacturing Technology" report. Contact: Deloitte & Touche's Manufacturing, Distribution and Services Group, Chicago, Ill. (312) 946-3000

"CIM 500." Contact: Advanced Manufacturing Research, Cambridge, Mass. (617) 621-1700

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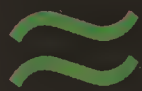
Factory Automation News, Market Intelligence Research Co., Mountain View, Calif. (415) 961-9000

"Foundations of World-Class Manufacturing Systems," symposium papers from 1991 conference. Contact: National Academy of Engineering, Washington, D.C. (202) 334-1255

"The Impact of Electronic Data Interchange on Industrial Strategies and Operations — An Interim Report," a Carnegie Mellon University/AIAG study. Contact: AIAG, Southfield, Mich. (313) 358-3570



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Limits to distributed computing

Problems include old software, new development and human nature

BY HAROLD LORIN

For over a decade, enterprises have dispersed computing resources out to departments and desktops in hopes of providing easy-to-use, easily managed, responsive computing systems.

However, the goals of distributed computing have proved elusive. Companies continue to feel uncertain about what should be done in the hand, on the lap, on the desk, in the closet or in the glass house.

Enterprises continue to discover limits to coherent integrated systems, systems that would enable all enterprise computing resources to be used and managed as a single pool.

What we're striving for

An ideal, mature, integrated, distributed system is a logical collection of resources physically dispersed, recollectable and redispersable. For such a system, a change of residence of data from San Francisco to New York would present no more difficulty than a change from drive A to drive B.

A local replacement of workstations with X Window System terminals and servers would be accomplished as a re-configuration of functional residence. A program executing on node A might next execute on node B with the same flexibility available on a tightly coupled multiprocessor. Boundaries and seams would exist only where intentionally defined for reasons of security, integrity, performance and scale.

A coherent integrated distribution system would permit various concepts of distributed computing to be treated as configuration options. The concepts of cooperative processing, peer-to-peer and client/server would be mere variations in the dispersion of function and control. Similarly, multiple sets

Lorin is a writer and consultant on computer system and management issues and has worked with IBM in various consulting positions during the last 23 years. He is also an adjunct senior professor at Hofstra University in Hempstead, N.Y.

of interfaces and protocols would coexist in the same structure.

Unfortunately, this idealized system is some time away (see story page 84). "Distributed" systems in the real world today contain constraints and complexities and are as difficult to evolve and manage as were centralized systems at the beginnings of the quest for distributed computing.

and compilers do not organize data in the same way. When software elements do not work together on the same machine, they surely cannot work together on a network. Vendors are just now trying to correct basic structural problems in software to allow greater integration.

Similar limits of software cooperation and data sharing occur because of competition



Philip Anderson

There are a number of limits to the maturation of distributed computing. These limits fall into three broad categories:

- **Inherited limits.** These are the data sharing and access limits companies inherit because of the lack of integration of software elements in both centralized and distributed environments. Inherited limits come about because of either vendors' narrow vision or healthy competition.

Narrow vision has resulted in single-vendor software that does not easily interact. Subsystems cannot access each other's data,

between vendors. In the past, vendors have had no motive for allowing their software to interact with competing systems. The legacy of this competition has been that companies can overcome interoperability limits only with enormous software investment.

- **State-of-the-art limits.** These are systems limits that are based on problems that have not yet been solved.

State-of-the-art limits require invention and innovation beyond the best proven

Continued on page 84

- **Distributed computing in an ideal world**
- **When will the infrastructure be ready?**
- **No dominant paradigm for the '90s**

Continued from page 83

technology. How fast these barriers will fall depends on how aggressive vendors are in forcing innovation and change. Companies currently need some understanding of how to handle scale (for example, no one really understands how a million nodes will work together), how to partition applications and how to develop applications in distributed environments.

• **Human nature limits.** This nontechnical limit slows the movement toward an ideal distributed computing environment. This limit is imposed by human nature, by how we manage things and how fast we can change our views.

Inherited limits

Software is an inherited limit because the systems that companies use are combinations of independently developed elements. These elements have duplicated function, private encoding of data, private directories and so on. They are difficult and expensive to use together. They often do not share data or function and force users to place function and data inconveniently according to restrictive system conventions.

The problems of fuzzy boundaries, badly defined interfaces and clumsy systems packaging have burdened large-systems users for years. These problems now burden the distributed system.

There is little older software that can be used for modern networking. Barriers in resource access and sharing do not come from geographical distance but ex-

is not clear that vendors see the need for this investment.

Over time, the marketplace will have an increasing awareness of the costs of installing, using and managing software with artificial barriers and unwholesome functional duplications.

Some estimate that in excess of 45% of an information processing budget is spent on systems software management.

Of course, there are inherited limits that do not come from bad software partitioning within a single system. The difficulties of sharing data between some systems, such as the various Unix systems and IBM MVS and VM, come from healthy competition.

Clearly, in the presence of diverse architectures, operating systems, communications protocols, interfaces, data models, security models and recovery models, there will be limitations on how data can move throughout a system and limits on what functions can be applied to what data at what place.

Companies must understand how to create seamless integrated systems in which all data is available in all environments from all access points. At issue is the extent to which barriers can be overcome and how best to overcome them. Will there always be more limits to access and sharing in heterogeneous systems than in homogeneous systems? The likely answer is yes, but we must make that answer true only for irreconcilable systems differences.

One way of sidestepping the limitations of heterogeneous computing is to

and interfaces, the industry is moving toward one system image.

In this image, the current limitations of each environment fall away. Whether the system comes in a box marked MVS, VM, VMS, OS/2, the Open Software Foundation's OSF or DOS does not matter if the applications developed for it conform to a set of intersecting interfaces and protocols. One can expect that fewer and fewer business-critical applications will run on system-specific interfaces.

By 1999, no one, not even the most loyal MVSeers, will be writing applications that depend on some artful knowledge of the contents of Register 14. Posix on MVS, Open Systems Interconnect (OSI) in Unix, converged Common User Access/Motif are just elements in a trend toward "open" homogenization.

Over time, homogeneity occurs naturally because the market wants it to occur. Even Unix will disappear. There will be a day in 199X where no one in the world will see the shells behind a platform-independent multimedia interface.

However, there are barriers in the way of this image of impending homogeneity. We are awash in standards for interfaces and protocols; standards overlap, conflict, content and confound.

The multiplicity of standards makes it probable that open homogeneity will not be prevalent until well into the future.

For a system to exist in an interoperable network, it needs to support multiple protocols and interfaces. For example, a system might have to talk OSI to a host and Transmission Control Protocol/Internet Protocol (TCP/IP) to a client.

In the meantime, companies need to enable sharing and access across heterogeneous machines. There are two ways to do so, but both are problematic.

One is to implement multiple interfaces and protocols more or less independently of each other. A program can choose to use OSI, Systems Network Architecture (SNA) or TCP/IP protocols, depending on the environment it wishes to talk to.

Optionally (and elegantly), it might be possible that the program always issues the same command, regardless of protocol stack, and the system chooses a protocol stack based on knowledge of the stack at the other end of the wire. This approach promises full employment for large numbers of programmers.

Despite this attractive feature, there are severe problems having to do (yet again) with structure. A database manager may depend on a communications manager in a particular way for recovery, fault reporting and so on. Multiple protocol stacks do not necessarily enable a database manager to run on all of them and to communicate with database managers running on other stacks.

Using multiple stacks requires investment in software redefinition and restructuring that is not likely high on vendors' priority lists. It is hard to restructure software, particularly older software that is not properly represented by design documentation and is perhaps even written in assembler language.

Another way to share and access data across machines is through interface or protocol translations: adapters, bridges, gateways and so on, depending on where one is making an intervention. Thus, a program running on OSI could talk to a program running on SNA because a trans-

lation process has occurred. This is something in the spirit of Sun Microsystems, Inc.'s External Data Reference (which is part of its Network File System), which converts various data codes into a canonical form for retranslation into the environment of an alien and remote system.

There can be some splendid computer science going on when the information systems department tries to do translation between languages, compiler conventions and file system conventions. However, this science can lead companies to problems of a philosophical nature.

The point is that systems differ in more than syntax, or where in a system structure they place certain functions or how they encode a "W." They differ in fundamental semantics in a way that does not allow translation or allows translation with much being lost in it. No gateway, adapter, bridge or whatever will resolve Unix sharing semantics with MVS sharing semantics.

While it is sure that some data access and sharing boundaries can be overcome by translation, many will only be partially overcome, and application programs will have to be aware of shifts in semantics. The philosophical part is whether it is a service to a programmer to provide vaguely similar semantics across systems boundaries.

State-of-the-art limits

Technologies in computing tend to have three phases: They require proof of concept (idea stage); they are ready to be piloted; and they are ready to be exploited. A state-of-the-art limitation exists in cases in which technology for accomplishing a system goal has not yet had proof of concept.

For example, in "open" environments, while some translation algorithms may be ready to pilot, the concept of multiple protocols is ready to be exploited. But in terms of distributed computing, proof of concept is still needed regarding the behavior of networks of enormous scale, methodologies used for developing distributed applications and methodologies used for systems management of large, heterogeneous systems.

The state of the art in developing distributed applications has moved very little in the nearly 15 years of need. In client/server structures, for example, applications exist only on the client, and progress can be made without new concepts aimed at application partitioning. However, other models of distributed computing require design and analysis tools that need proper partitions and distributions.

Current "upperCASE" tools — those computer-aided software engineering (CASE) tools for analysis and design in the early stages of the life cycle — provide little help in assessing how to split an application program, how to decide how big the pieces should be and how to gauge how far away the pieces can be from each other and still perform. Advanced simulation and modeling techniques are required for some aspects of this work.

However, many design tools that could be useful (short of modeling) have not been developed because of the small-application orientation of most current software vendors. Providing yet another remote procedure call does not empower distributed applications because it does not empower their conceptualization.

There is equally little support for

Continued on page 88

Waiting for the infrastructure

When will the distributed computing infrastructure be ready? That's the question of the decade.

Old, bad software is holding distributed computing back. Integrated systems structures for open distributed systems will be possible only through a major redo of current systems. No one can afford such an undertaking with current software development technology.

A precondition for mature distributed computing is an advanced systems software development capability providing an order of magnitude of more productivity.

With this production capability and the will to use it, coherent distributed systems could exist in about five years. Otherwise, current systems will continue to be jerry-built and will eventually be replaced rather than evolving into better structures.

ist in a single node. Our software history has given rise to access boundaries because of private directory and encoding, shifts in security and recovery mechanisms and differing levels of service from one layer to another. This software history makes coherent integrated systems seem far away indeed.

Old, inherited software is a limit that needs to be overcome. Extending individual subsystems or languages to accommodate distributed computing does not address the interlanguage, intersubsystem barriers existing across and within nodes. Those who have experienced aspects of "cooperative computing" (applications split between desktop and host) may have encountered issues of applications in multiple languages (C and Cobol) and the horrific technical, cultural and management issues that arise.

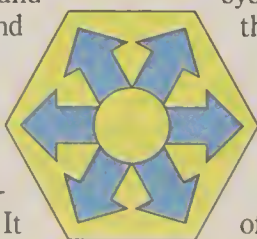
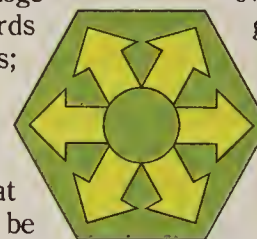
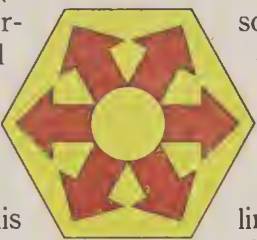
To achieve coherent distributed computing, there must be an investment on the part of vendors to restructure, re-engineer and integrate old software. It

avoid them altogether by imposing homogeneity on all systems elements for an enterprise or for a domain in the enterprise.

However, homogeneity as a general solution is just not practical. Technically, there is no single environment that spans all classes of machine for enough kinds of work loads. IBM's Systems Application Architecture (SAA), for instance, is not truly a single environment; IBM MVS/VSE with CICS is limited to a particular kind of work load; Digital Equipment Corp.'s VMS is excluded from a class of large machines; Unix is effective on large machines only for special work loads.

Furthermore, from a management point of view, it is hard to ignore pressure from business departments to acquire systems to solve problems, even if they introduce heterogeneity.

But a form of homogeneity may be coming from the culture of "open." As SAA, DEC's Network Applications System, Unix and niche vendor offerings interchange protocols



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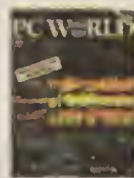
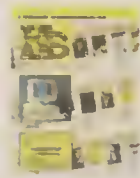
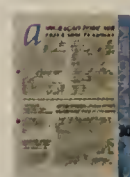
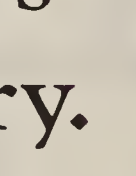
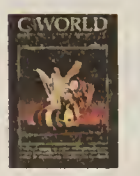
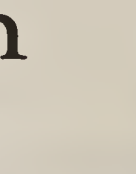
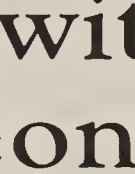
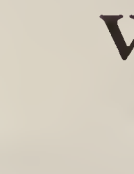
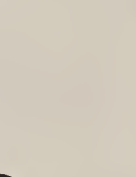
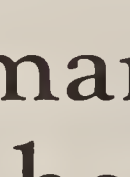
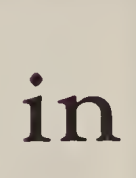
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The World of Information Technology

*Source: International Data Corporation. © 1991 International Data Group

Continued on page 88

distributed applications development group work in heterogeneous environments. On the contrary, there are barriers introduced by compiler and language divergences across systems and by the lack of library control facilities for noncentralized development environments.

Applications development in "open" environments involving interaction between IBM AD/Cycle, DEC Cohesion or any other workbench is confounded by the lack of progress in achieving interoperability between platforms.

There is hope that object orientation will address many of these issues of distributed computing software develop-

ment. Object orientation can provide an enduring structure for representing interfaces and protocols by providing a unit (the object) of dispersion across the network. An object is an essentially distributable software structure.

The current state of systems management is just as detrimental to achieving the goal of distributed systems as applications development limits are. There is tremendous activity by the International Organization for Standardization in defining systems management protocols and interfaces (CMIS and CMIP, for example). The Distributed Management Environment of the OSF is also about to arrive. And, of course, there is Systemview from IBM.

But these approaches are in early stages. Firms lack conviction that all is conceptually sound and fear that even if all is well on paper, they are some years from code that will manage heterogeneous systems behind a single syntax and semantic.

The history of the industry has been dismal in this regard from the earliest days of systems management on mainframes.

Companies have incoherent and unusable interfaces that maximize the expertise required to manage even a single frame and that stretch operational staffs to the limit.

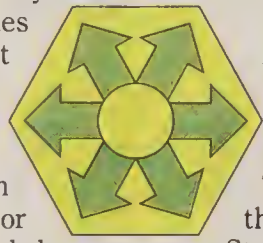
While there is keen interest in automated operations, unattended operations, intervender systems management, interoperability and emerging standards,

companies are a long way from being ready to pilot many ideas in this area, let alone exploit them.

Human nature limits

Beyond technical limits to distributed computing, there is the limit imposed by our nature as thinkers and managers.

By their nature, coherent systems can only exist in coherent and appropriate management structures. These structures enable the development of proper human skills to support and be supported by appropriate technology. We seem doomed to manage the last generation of technology and unable to shift our views fast enough to form management cultures that can take advantage of the economics of distributed computing. We've become



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Computing in the '90s

There will be no dominant paradigm of computing in the 1990s. Neither the server, the workstation nor the mainframe will dominate.

Why? Because the key economic event of computing in the 1990s is the development of interconnect capacity that is a thousand times better than it is today. When this interconnect capacity becomes available, we will be able to put function and data where we please, and we will invest in interconnect technologies rather than local logic and storage.

The biggest problem will be figuring out where to put data and function, based on business need.

set in attitudes that hamper our ability to make proper investments.

We sometimes spend more on managing a resource than the resource is worth.

It is profoundly difficult to recognize the true extent of change and to draw the inferences of the startling changes in technology over the last decades. Many believe in the existence of two cultures: one centered on high-performance workbenches and object-oriented tool kits and the other on mainframes and Cobol. Some believe these cultures of the "future" and the "legacy" are irreconcilable.



The image of a coherent distributed computing system is an image of falling boundaries between machines, between suites of interfaces and protocols and between cultures. Unhappily, many barriers are in the way of this image. Some of these come from an unfortunate history of software "ad hocery" and investment. Enterprises must balance the benefits of coherence and those of radical innovation. Over time, as systems assume more common personalities and our understanding of system structures improves, perhaps our choices will be less difficult. •

For a detailed look at the status of distributed databases, read next week's Product Spotlight.

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- 51. Sales & Mktg. Management



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COMPUTER INDUSTRY

NATIONAL BRIEFS

Getting to the point

► Fremont, Calif.-based input and imaging devices vendor **Logitech, Inc.** is about to plant its flag in the growing pen-based computing niche with the acquisition of up to a 51% equity stake in Simi Valley, Calif.-based pen products vendor **Gazelle Graphic Systems, Inc.** Logitech's proposed investment, estimated in the multi-million-dollar ballpark, will be used to increase research and development in the pen arena, as well as to garner for Logitech exclusive distribution rights to all Gazelle pen- and tablet-based wares.

Where's Nolan?

► **Office Automation Systems, Inc.**, an 8-year-old printer vendor based in San Diego, has a new name — **Octus** — and a new product strategy. The firm plans to roll out several lines of personal computer-based shared network products by year-end 1991. "We call them 'shared' network appliances, because it is [our] intention to make [them] as easy to use as toasters or telephones," said the firm's new chairman, **Nolan K. Bushnell**, who a decade ago kicked off video game mania with his invention of **Pong**.

Don't knock the Baldrige

► According to Huntington, N.Y.-based Weber Management Consultants, the **Malcolm Baldrige National Quality Award** is taken seriously indeed in the executive suites of the nation's leading manufacturing firms. Weber surveyed 98 such firms and found that 80% of them saw the Baldrige as an effective quality driver in U.S. industry.

SAP and Cap

► European software and services players **SAP AG** and **Cap Gemini Sogeti** are already long-term marketing allies. Earlier this month, software firm SAP and services purveyor Cap Gemini extended their 13-country cooperative tradition to a 14th national base: the U.S. SAP subsidiary **SAP America, Inc.** in Philadelphia and New York-based **Cap Gemini America** signed a pact aimed at wedding SAP's mainframe application software to Cap Gemini consulting for the aid of a broad range of U.S. commercial and manufacturing users.

Offshore software crews save labor costs

BY GARY H. ANTHERS
CW STAFF

Looking for a way to better balance its worldwide supply and demand for programmers and analysts, Electronic Data Systems Corp. last year set up a "buffer pool" of software developers in Ireland.

The Dallas-based systems integrator was following a long line of computer industry companies that have been shipping software development offshore in search of the benefits that drove manufacturing operations overseas in the early 1980s: access to foreign customers, tax breaks, local government incentives and inexpensive skilled labor.

The benefits are there to be found — but not for free, say some of the companies that have gone the offshore route. New management challenges accompany the global spread (see story page 91).

At this point, nearly every major U.S.-based computer hardware and software maker has overseas operations. Ireland, Scotland, India, Singapore and the Philippines are favorite sites, thanks to an abundance of skilled, low-paid, English-speaking workers. Ireland has been

particularly successful in attracting U.S. software firms, which receive from \$10,000 to \$20,000 in government subsidies and grants for each local employee hired. As an added incentive, unemployment rates above 15% keep employee turnover rates near zero.

An Irish Silicon Valley

So many U.S. software developers have set up shop in Ireland that it has spawned a Silicon Valley-like infrastructure, which in turn draws more companies. Timothy Daly, vice president of worldwide operations at Santa Clara, Calif.-based Claris Corp., said his firm chose Ireland for its European manufacturing center partly because of the availability of services such as language translation and high-quality printing. "Most of the PC software companies are there, and it's one of the best places in the world to go for that reason," he said.

EDS' Dublin Development Center contributes people on a temporary basis to client sites around Europe, and its on-site staff absorbs work-load peaks from U.S.-based projects.

With current communications networks and standardized de-

The pay/per chase

Cheaper wages for computer personnel overseas could translate into better bottom lines for software development

Average wages for programmers and analysts
(in U.S. dollars per year)

	Programmer	Analyst
U.S.	\$34,000	\$38,700
Republic of Ireland	\$16,500	\$20,200
India	\$5,200	NA
Philippines	\$5,100	NA

Source: U.S. Department of Labor, Bureau of Labor Statistics; Industrial Development Authority of Ireland; Consulate General of India; Embassy of the Philippines

CW Chart: Michael Siggins

velopment methods, the firm could have put such a center just about anywhere, said Dick King, president of EDS' Pan-European Strategic Business Unit, based in Zurich. "With a new American banking system, there's no reason a piece can't be carved out and worked on in Dublin just as well as in the U.S. The objective is to keep it transparent to the customer."

Texas Instruments, Inc.'s customers for its computer-aided design (CAD) tools are its own chip designers, and the company targets some 300

workers at developing and improving software support for designers. Finding it difficult to hire people with both engineering and computer science skills, TI opened a shop in 1985 in Bangalore, India, where 100 developers now devote their time to CAD work while another 100 design chips using the CAD tools.

Developing software in India costs between 40% and 70% of what it costs in the U.S., said Robert Rozeboom, a TI Semiconductor Group vice president. But he said the move to India was

Continued on page 91

Defense firm builds on rugged experience

BY MITCH BETTS
CW STAFF

Like other systems integrators in the defense industry, C3, Inc. in Herndon, Va., is responding to the end of the Cold War by trying to diversify into civilian businesses. But C3 has targeted an unusual niche: It wants to make notepad computers that are rugged enough for blue-collar jobs.

In essence, C3 plans to exploit its experience making microcomputers under stringent military specifications, such as the ones used by the soldiers of Operation Desert Storm [CW, Feb. 18].

David Shepherd, vice president for marketing and corporate development, said the commercial applications include utility repair crews, oil drillers and police and emergency personnel.

Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass., agreed that there is a market for notepad

computers in harsh environments. However, he cautioned, the company is entering a market that is already getting crowded.

Stephen said that Grid Systems Corp. and several start-ups have also identified a market for notepad personal computers that can work in wide temperature ranges and dusty condi-

tions. Like any other entrant, C3 will need to "invest in distribution, sales and building a brand image" in order to be successful, he said.

Survival instincts

Shepherd said that C3's market research has shown that "not many providers or users have quite understood, yet, what it takes to make a computer survive outside."

He said that what C3 calls "environmentally indifferent computing" requires the computer to stand up to Mother Nature, including the heat that

builds up inside a truck on a summer day. In addition, the computer must be "human-proof" so it keeps on clicking after "you drop it in a puddle of water or throw it into the backseat of your car," Shepherd emphasized.

Furthermore, the screen must be readable day and night, and the interface must be usable by workers wearing gloves in cold weather, he said.

C3's commercial standard for ruggedness will not be as rigorous as the military specification, however, which will keep the cost down. The commercial standard is "enough for the utility in Duluth, Minn., and the utility in Miami," Shepherd said, but not enough for the Arctic Circle, as the military requires.

He said C3's pen-based computers are likely to have the computing power of Intel Corp.'s 80386 chip and to be commercially available in late 1992. The hardware and software will be customized for vertical-market applications.

For example, Shepherd said, a notepad PC system could allow a police officer to make fingerprint identifications from the patrol car or give a utility repair crew a digital map of the utility's poles and cables.

Harsh climate

C3, Inc.'s commercial standard for a rugged notepad computer includes the following specifications:

- **Altitude:** Up to 11,000 feet.
- **Waterproof:** 5 minutes, at 2 ft below surface.
- **High temperature (operating):** 55 degrees C.
- **Low temperature (operating):** -15 degrees C.
- **Operating shock:** 5 ft drop to concrete, any axis.
- **Viewable:** Direct sunlight and total darkness.
- **Mean time between failure:** More than 5,000 hours.

Source: C3, Inc.

CW Chart: Michael Siggins

Another Symmetrix First.

EMC's Symmetrix: First RAID-based Product To Market

September 25, 1990, Hopkinton, MA—EMC Corporation today announced their Symmetrix Series of Integrated Cached Disk Arrays. By doing so, the company is the first to introduce a RAID-based product to the mainframe marketplace. This revolutionary technology will allow users to store large amounts of data in an extremely small footprint, at a cost higher than traditional DASD levels.

Users and analysts alike are excited about this new development in the storage hierarchy available to mainframe users. Traditional DASD storage devices consist of large 14-inch platters. The new EMC technology redefines the standard of mainframe DASD by combining several 5.25-inch disks, with a board-level controller, to store large amounts of data in a much smaller footprint.

downsized applications, reducing the size of the data base. Of vital importance is an integrated control client linked to one or more host mainframes.

Symmetrix Is First in Performance

Users of S/370 and S/390 mainframe computers worldwide are witnessing the phenomenal performance benefits of EMC's Symmetrix Series of Integrated Cached Disk Arrays. Users are consistently seeing a 30%-40% increase in performance. By accomplishing more work than ever before, they are able to increase the overall productivity of their companies. One satisfied customer stated, "EMC's Symmetrix is the most dramatic improvement I've seen in my data base."

40% PERFORMANCE GAIN



SYMMETRIX 3390

alarms, reminders, extensive calculations. "The ability to simplify the operation of the system," Clark Robert, Director for Chemicals, "make it easier to manage its type of data." De port box.

EMC's Symmetrix Celebrates First Birthday



September 25, 1991 Hopkinton, MA—Today, EMC's Symmetrix Series of Integrated Cached Disk Arrays is celebrating its first "birthday". The product, a revolutionary disk array device, was the first RAID-based product for mainframe systems to market. Symmetrix remains the only RAID-based product available to IBM and mainframe users. During the year the product met its performance goals and has become the market by standard. "The product is a success," stated.

Symmetrix Turns One—And Only.

On its first birthday, EMC's Symmetrix Integrated Cached Disk Array (ICDA™) has a lot to celebrate. So do the hundreds of System 370/390 users gaining the benefits of Symmetrix today. In fact, the only people missing from the party are the ones who've been missing all along. Namely, the companies who keep promising the birth of their own RAID (Redundant Arrays of Inexpensive Disks) based products—but who, so far, have yet to deliver.

Our One-Year-Old Has Your Features.

Symmetrix replaces the traditional design of 3380/3390-type DASD with an array of up to 24, 5 1/4" disks, supported by an integrated controller



unit and up to 3GB of cache, all within 5 sq. ft. This revolutionary design is the foundation of a device that revolutionizes disk capacity, reliability and environmental economy. The icing on the cake has been the 40%-60% performance improvements consistently achieved by Symmetrix customers, whether they run a 4381 or multiple 3090-600J systems.

While array disk products are still just a gleam in our competition's eye, Symmetrix already has a proven history, giving users unprecedented performance gains and cost savings.

To learn more about these and other Symmetrix firsts, give us a call: 1-800-222-EMC2 ext. L164. (In MA call 508-435-1000; In Canada call 1-800-543-4782).

EMC²

Fox users cheer legal detente

But dropping of suits by Ashton-Tate, Fox leaves look-and-feel question

BY CHRISTOPHER LINDQUIST
CW STAFF

Now that Borland International, Inc. has all but completed the purchase of Ashton-Tate Corp., the pending reciprocal dropping of lawsuits between Ashton-Tate and Fox Software, Inc. has met with enthusiastic support from Fox users.

However, the legal withdrawals also leave the "look-and-feel" intellectual property question unanswered.

Borland agreed to drop Ashton-Tate's suit against Fox in accordance with a consent decree filed by the U.S. Department of Justice, which stated that Borland would need to drop the suit if countercharges filed by Fox were also dropped.

The consent decree further

enjoins Borland from suing other competitors whose products are based on Ashton-Tate's Dbase language. Had Borland not agreed to the consent decree, the Department of Justice said that a civil antitrust suit would have been filed to prevent the acquisition.

Fox issued a statement earlier this month indicating that it had begun the process of dropping its countersuit, setting in motion the rest of the decree's requirements.

Ron Palenski, general counsel for software industry association Adapso, said he did not think judicial resolution of the Ashton-Tate/Fox case would have yielded a be-all, end-all answer to the

questions of what can be protected, how and by whom in the intellectual property area.

But while the question of software-related intellectual property rights is still up in the air, users said they were pleased that market share, at least for Dbase-derived database software such as Foxpro and Borland's Object Dbase for Windows, will now be decided on product merits as opposed to legal maneuvering.

"It's about time [the suit was dropped]," said Y. Alan Griver, partner at Flash Creative Management, Inc. in Teaneck, N.J. He added that competing on technology is a "win situation for all users."



Third-quarter 1991 earnings

Company	Revenue June to Sept. 1991	Percent change from 1990	Profit June to Sept. 1991	Percent change from 1990
Amdahl Corp.	\$419.29M	(14%)	\$5.4M	(88%)
Ameritech	\$2.7B	1.4%	\$379.4M	(23%)
Apple Computer, Inc.	\$1.51B	11%	\$81.2M	(18%)
AST Research	\$197.1M	45%	\$16.5M	44%
BMC Software, Inc.	\$43.83M	50%	\$10.82M	100%
Electronic Data Systems	\$1.73B	13%	\$145.5M	13%
Knowledgeware, Inc.	\$21.6M	9%	(\$4.9M)	—
Landmark Graphics Corp.	\$21.1M	21%	\$2M	67%
Micrografx, Inc.	\$9.8M	45%	\$1.04M	6.6%
Sequent Computer Systems, Inc.	\$53.8M	(19%)	(\$23M)	—
Sequoia Systems, Inc.	\$16.94M	30%	\$1.41M	37%
Storage Technology Corp.	\$298.2M	12.4%	\$21.5M	34.4%
Stratus Computer, Inc.	\$112.5M	8%	\$13.9M	43%
Zeos International Ltd.	\$47.35M	39%	\$2.39M	170%

Parentheses indicate a reduction or loss

CW Chart: Michael Siggins

Russians are coming

When Benson Computer Research Corp. in McLean, Va., recently unveiled Imagefast, a personal computer-based document management system, the announcement looked like any of dozens of recent product announcements in the PC world. But its roots were anything but run-of-the-mill: Imagefast was developed primarily by two Soviet programmers whom Benson brought to the U.S. just for that purpose.

"They are absolutely at the leading edge of technology in C programming in a Windows environment," President James Benson said. "They have advanced documentation from Microsoft. Where they get it, I don't know, but the people I interviewed [in Moscow] knew more about the plans of Microsoft in object linking and embedding than most programmers here."

Benson also said Soviet programmers may be better in general than U.S. programmers because they have to compensate for poorer hardware.

"If I had the resources, I'd be over in Russia and Eastern Europe setting up programming sites and commercializing software there," he said.

GARY H. ANTHERS

Offshore software crews save labor costs

CONTINUED FROM PAGE 89

not motivated by cost as much as by the availability of skilled labor. He said the theoretical skills of Indian university graduates are "very strong," although the practical, "hands-on" skills are not quite up to par.

Some companies do not actually write software overseas but have found advantages in offshore software "manufacturing." Sunnyvale, Calif.-based Boole & Babbage, Inc. does most of the coding for its products in the U.S., then ships a master tape to Ireland for duplication and distribution throughout Europe. Until April 1990, Ireland had no tax on manufactured goods; now the country levies only a 10% tax on software sales, a rate guaranteed by the government until 2010. The comparable rate in other countries ranges from 25% to 50%, according to Boole & Babbage.

In addition to its Cambridge, Mass., headquarters, Lotus Development Corp. has 170 developers in Tokyo, 120 in Singapore and 300 people in Dublin, where it codes its Unix-based products for worldwide distribution. Its Dublin workers also translate Lotus' products into as many as 15 languages.

Lotus opened its Tokyo shop solely to serve the Japanese market. It is staffed almost entirely with Japanese workers, who are uniquely qualified to deal with local customers, said Larry Crume, vice president of international planning and development. "Customers in Japan are far more demanding than in any other place in their expectations for support and other things."

Software developers are finding that overseas customers in-

creasingly insist that products be uniquely tailored for local conditions. John Smith, managing partner for application products at Chicago-based Andersen Consulting, said his 100-person software facility near Nice, France, adapts Andersen's financial applications to reflect the accounting, payroll and human resources practices of each major European country. "We send all our software to France, then bring in people from other European countries to tailor it for those

countries," he said.

Andersen fits a pattern in which firms set up facilities in Europe to be close to customers and skilled workers, but also go to the Philippines, the Caribbean and Singapore for cost savings. Smith said Andersen's Manila operation, which employs 300 people, operates at half the cost of a comparable shop in the U.S. "It's especially good for products with more of a margin squeeze. We can afford to support them longer," he said.

Can we all talk?

At 7 a.m. at least twice a week, an official at Digital Equipment Corp.'s Acton, Mass., facility kicks off a conference call linking as many as 30 people in 13 countries. DEC software developers in Europe have an early lunch on those days, while those in the Far East forgo their evening activities for the two- to three-hour telephone meetings.

The conference callers, many of whom are working on different pieces of the same project thousands of miles apart, give status reports, discuss problems and sometimes even participate in design reviews.

"It requires mutual commitment. It's really hard work," said James Mills, DEC's manager of cross-engineering services. "It requires good planning, good agendas, written materials distributed in advance, a moderator and a well-defined protocol for who gets to speak when."

Texas Instruments' Robert Rozeboom manages the company's Bedford, England, and Bangalore, India, operations from his office at TI's Dallas headquarters. Like most managers in that position, he said that is a special challenge. "Instantaneous communications are vital."

He said he uses TI's wide-area network for electronic mail, file transfer and remote computer log-in for source-code management. TI bought a satellite earth station in India to tie into the network, and Rozeboom said he hopes to use the station some day to support videoconferencing between Dallas, Bedford and Bangalore.

GARY H. ANTHERS

INTERNATIONAL BRIEFS

Family ties

► Germany's Siemens AG said last week that it would offer shareholders of loss-plagued Siemens/Nixdorf Informationssysteme AG \$132 for each share not owned by Siemens. Siemens, which believes that closer ties to the parent firm will help Siemens/Nixdorf raise the capital it needs to compete, plans to raise its stake in Siemens/Nixdorf in two steps. Between Oct. 28 and Dec. 6 it wants to acquire at least 95%. Siemens/Nixdorf shareholders who do not accept the current Siemens offer will get another, this time determined by independent consultants.

Words' worth

► The synonym dictionary that comes with the Swedish version of Wordperfect Corp.'s word processing software is illegal, according to Alva Stromberg, who claims she is the work's real author. Stromberg has filed for compensatory damages of \$16,106 plus 19 cents for every copy of the program sold.

International relations

► Personal computer relational database systems vendor Dataease International, Inc. lived up to its name last week when it merged with its UK-based distributor, Sapphire International PLC. The new Dataease Sapphire International Group will enter corporate life with \$40 million in combined revenue and approximately 250 employees.

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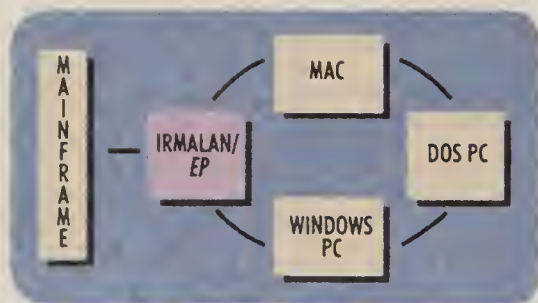


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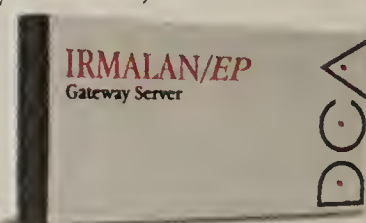
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COMPUTER CAREERS

IRM positions require broader IS skills

BY ALICE LAPLANTE
SPECIAL TO CW

Until recently, information resource management (IRM) was a term heard almost exclusively in the halls of government. In the last couple of years, however, this phrase has crossed over to the private sector. Though some confusion still exists about exactly what it signifies in a business context, employment experts say that IRM is a concept career-minded information systems professionals would be well-advised to explore.

The federal government has been working with the concept of IRM for over a decade. Since it instituted the Paperwork Reduction Act of 1980, it has been using IRM to describe the entire life cycle of information in federal offices — all collection, manipulation, distribution, communication and disposition of data comes under IRM — whether that information is paper-based or electronic. Thus, IS falls within IRM, not the other way around.

In some instances, businesses have picked up on the federal government model and created IRM functions that include, but stretch considerably beyond, IS. More commonly, however, IRM

is treated as an outgrowth of the IS function.

"Most organizations still haven't consolidated all these aspects of managing information and don't have a separate function for managing it," says Jim Webber, president of Omicron in Edison, N.J., a consortium of Fortune 500 IS managers.

The IS puzzle

"Very few people recognize IRM as a discipline that differs from IS," agrees Bill Monteith, corporate director of IRM at Armco, Inc., a steel manufacturing firm in Middletown, Ohio, where IS is considered part of IRM.

Armco created its IRM department by combining IS with other manual information management functions in the early 1980s because it "better fit what we were trying to do as a business," says Monteith, who is, in effect, the chief information officer at Armco.

"The bulk of our people still fall into the classification of IS," Monteith says. However, he also employs a number of business and methods analysts who are responsible for tracking the flow of information through an entire business process or department to uncover and re-engineer any inefficiencies. Such positions re-

quire a broad technical background and keen analytical skills, Monteith says.

In some instances, decentralization has spurred companies to explore IRM, and the primary role of those in this function is coordination of scattered IS departments.

"When you have multiple systems under development in different end-user communities, one of the roles of the IRM manager is to make sure that different departments aren't duplicating — or even purchasing — data that already exists elsewhere," says Ray Davey, director of information services at Electronic Systems Personnel, an IS search firm in Minneapolis.

Moving from an IS track to a broader IRM focus is probably easiest for those with experience in database administration, information systems security and communications, according to IS recruiters.

"Data-flow diagramming abilities, database schematics experience, structured analysis and methodology skills, as well as sound analytical abilities are all

important skills in the IRM world," says Richard Wonder, national director of the IS division at Robert Half International, Inc. in Menlo Park, Calif.

Wonder and other IS recruiters caution that IRM positions — at least in the private sector — are rarely advertised under that name. Instead, such positions fall under the classification of data administrators or analysts.

Teamsters Health and Welfare Fund of Philadelphia and Vicinity, which manages the insurance fund for the Teamsters Union, has an employee in the data administration function of IS whose job goes well beyond that of simply a database administrator, says Ronald Dell, facilities MIS manager.

"I actually don't have a specific title for this employee, but he works as a high-level liaison between IS and key business functions in tracking critical data," Dell says.

Specifically, this employee is responsible for tracking payments to hospitals in order to make sure Teamsters Health and

Welfare qualifies for prompt-payment discounts, which can range from 10% to 15% of a patient's medical bill. This same employee also tracks patient "paperwork," usually in electronic form, through hospitals and health care facilities.

Desired skills

Because of the broad-based nature of such positions, there is more to being a good candidate for IRM than just having the right technical skills.

Because IRM involves tracking and, if necessary, redesigning entire business processes around the more efficient and cost-effective management of information, sharp interpersonal skills are essential.

At the Centers for Disease Control (CDC) in Atlanta, one responsibility of IRM is to work with the end-user community to discuss its information needs and frustrations and how to better serve them.

"Being able to lead a group of people toward a common goal [of better information access] and manage the dynamics of a meeting to arrive at a consensus about possible new ways of doing things are very important to the IRM function," says Jim Seligman, deputy director of the CDC's IRM office.

LaPlante is a free-lance writer based in Palo Alto, Calif.



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Prepare yourself for possible layoffs

IS workers are more marketable in a job search if they are still employed

Fast Track is a twice-monthly column dedicated to answering questions on career directions.

BY JACK FERRARA
and PAM SUMMERS
SPECIAL TO CW

Q There's been talk of possible layoffs in my company, which has so far held its ground in this economic slump. Would you advise that I start looking for a job or should I hope for the best?

M.D.

New York

A Now is the time for you to test the waters. You are much more marketable if you are still employed. Companies sometimes worry that applicants who are not working may not be really enthusiastic about the position they have to offer, just anxious to connect with any job.

It is wise to be ready for a possible layoff. You may feel that your company is doing well and that your position is secure, but it cannot hurt to be prepared.

Q Though I'm an accountant by trade, I'm fascinated by computers and wish to transfer into our systems department. I'm a little skeptical that this would be a good move for a nontechnical person. What's your advice for this idea?

Initials and town withheld

A You could work as a systems analyst trainee. In this role, you would be involved in helping design the business systems that the end users need by lending

your accounting viewpoint.

However, if you really become serious about staying in the information systems end of things, you will need to go back to school — whether full- or part-time — for a more in-depth technical background.

FAST TRACK CAREER ADVICE FOR THE '90s

Q What do you think the future holds for a programmer who loves to code but is not very skilled or has little interest in working with users?

Initials and town withheld

A Consulting companies usually need "plain vanilla coders" for various projects.

Overall, though, the future is very limited for someone who wishes to remain a coder because the natural progression is from programmer to analyst.

I've never seen the position "career coder" on an IS organizational chart.

Q What information is sought by companies in follow-up interviews, especially when it comes to the fourth or fifth?

Initials and town withheld

A Companies rarely go beyond the third interview. Assuming that the fourth or fifth interview represents the final stages of the process, applicants should expect a social-setting-type interview. Your demeanor is being observed here. Think before you speak, and watch your etiquette and body language.

Q I have 10 years of experience in systems programming and degrees in English and mass communication. What's the most effective way to conduct a job search in Europe, particularly in England?

D.S.G.

St. Louis

A The most effective way to conduct an international search is to be present and available in the locale that is the focus of your desired relocation. I would recommend you take an extended visit to England, if that's at all feasible.

Ferrara is senior data processing recruiter and Summers is vice president and MIS specialist at Russoli Associates, Inc. in Allentown, Pa.

We welcome your questions. Send them to Cathy Duffy, Careers Fast Track, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. Letters may be edited for brevity and clarity. Your initials and town will be printed unless you request otherwise.

TIP of the MONTH

How can IS staff deal with unreasonable requests from top management?



If management wants a project completed under impossible conditions, implement it in phases. Show management how you can deliver most of the project within the stipulated budget and deadline.

Robert Kramer

Director of Software Development
Student Loan Marketing Associates
Washington, D.C.

.....
Analyze not only how you can meet the request but also cite the consequences of complying. Management needs to know what results will occur from a decision. If inferior service will result from a decision, you must alert management to this.

Fred Heger

Assistant vice president
Southwestern Bell Telephone, St. Louis

If senior management asks you to deliver a project under an impossible deadline, you have two choices. You can tell them outright it can't be done and face the consequences. Or, you can try to get the job done with proven contractors. Aim to deliver success and worry about the price tag later.



Regis Garbo

Director, data center and telecommunications
Lever Brothers Co., USA, Englewood Cliffs, N.J.



When unexpected changes in the business plan occur, just stop everything and work on the company's priorities. IS professionals are in the service business; we have no choice but to respond to requests.

George Brenner

Director, corporate information services
MCA, Inc., Universal City Studios, Calif.

Written and researched by Jill Vitiello, a free-lance writer based in East Brunswick, N.J.

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International Data Group, the world's leader in information services on information technology, seeks two Programmer Analysts.

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The second position will design and develop database applications to support IDG's Computer Buying World magazine in Wakefield, MA. Extensive Foxbase/dBase proficiency required at this mixed Mac/PC networked location. Position requires detailed knowledge of Mac hardware, operating systems, utilities and networking. "C", Basic UNIX, VAX and other minicomputer experience a plus. 2 - 3 years experience plus AS/BS in computer technology expected.

Please send resume and salary expectations to Mary Cornetta for the Corporate IS position or to Beth Estabrook Corry for the CBP position at IDG, Five Speen Street, Framingham, MA 01701.

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Please send resume/salary requirements to: Tom Stiling - Employment Manager, Broadway & Seymour Development Corp., 128 S. Tryon St., Charlotte, NC 28202. No phone calls please.

EOE

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TRW has exciting opportunities for talented computer scientists and engineers in computer system security engineering research and applications programs. Candidates should have at least three years of computer science/system engineering experience with an emphasis on computer security and trusted systems as well as possess a working knowledge of DoD 5200.28. We have three available positions with the following requirements:

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TRW offers competitive salaries and a comprehensive benefits package, including flexible work hours, a year-end holiday week shutdown with pay, and more. For consideration, send your resume with salary history to: TRW Systems Division, Professional Placement, 1 Federal Systems Park Drive, Dept. EKCW, Fairfax, VA 22033-4411. An Equal Opportunity Employer.

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Requirements: a Bachelor's degree or equivalent combination of education and experience, good C programming skills, some X programming experience and a good grounding in 3D graphics algorithms and PHIGS or PEX internals very desirable.

Interested candidates should submit a cover letter referencing Job No. R91-176 and two copies of a resume to: James H. McCarthy, MIT Personnel Office, Bldg. E19-239, 77 Mass. Avenue, Cambridge, MA 02139-4307.

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LCC, the industry leader in Cellular system design seeks applicants with an advanced degree in Computer Science (or equivalent experience), with a minimum of 4 years experience in applications development in UNIX and C, databases, GIS, graphics (PHIGS, GKS), and X-Windows. X.25 software development is a plus.

Additional experience with software development methodologies and object oriented programming required. Should be able to work in a cooperative team environment and be able to independently design a medium to large-scale Multiuser software application. Knowledge and experience in complete software development lifecycle is a must.

LCC offers competitive salaries and a full-range of company-paid benefits, including health, vision and dental insurance, 401(K) retirement plan, and relocation assistance.

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DEVELOPMENT STAFF MEMBER: Research & development of high performance fault-tolerance storage subsystems. Development of detailed & complex analytical and/or simulation models of storage subsystems in high end file servers. This will include: (1) combined performance and reliability analysis using modeling tools such as Petri nets and/or queueing network (e.g. RESQ), (2) development of new and better algorithms for performance analysis of integrated software and hardware components of fault-tolerant file servers, (3) development of tools and techniques for real-time serve workload data collection and analysis. Ph.D. in Engineering Science/or Electrical Engineering. 1 yr. exp. in the job offered or 1 yr. related exp. as Pre- or Post-Doctoral Researcher. The one year related experience must include advanced research in performance analysis of parallel and distributed systems; Petri net modeling and RESQ package; and development of hardware and software for real-time data collection and analysis. 40 hrs/wk. \$50,000/yr. Send a resume to: Job Service of Florida, 105 East Broward Boulevard, Fort Lauderdale, FL 33301. Attention: Job Order No. FL 0501844.

SYSTEMS ANALYST: Design, analyze, enhance and maintain wide area of commercial application systems in multi-tasking environment such as Health Information Systems, Banking Information Systems, Production Planning and Control Systems, Financial Accounting Systems, System Software Applications involving terminal evaluation, batch processing controller, real time data acquisition. Develop and implement software on various mainframes and computer languages. Position requires B.S. in Electrical Engineering or related and four years experience as systems analyst or equivalent with educational or experience in commercial software/application systems setting, familiar with Fortran, PL/M, C, OS/2 and PS/2 Presentation Manager, PL/M 8086 Assembler, UNIFY, MS WINDOWS, UNIX, MSDOS, Micro and mainframe software development. Salary of \$36,000/yr., 40 hrs/wk. Qualified applicants please submit resume to Georgia Department of Labor, Job Order # GA 5507580, 2811 Lakewood Avenue, S.W., Atlanta, Georgia 30315, or to the nearest Georgia Job Service Center

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System Development-Supervisor, B.S. & M.S. in fields of computer science, physics or mathematics; four years systems analysis design and programming in conjunction with management of programmers; professional operation of: (1) DEC Vax hardware; (2) Database - RDB; (3) Operating systems - VMS; (4) Computer languages - COBOL, BASIC, VAX MACRO, C.; (5) Project management and tools - Microsoft; (6) Supervisory and management use of other softwares, including - DECFORMS, CMS, CDD, TDMS, ACMS, DTR. \$46,000. Contact GA Dept. Labor, Job # GA 5509510, 1275 Clarendon Ave., Avondale Estates, GA 30002.

CHEMIST (Burlington, VT area). Develop and implement defect free integrated film deposition processes necessary in the fabrication of 256 megabit dynamic Random Access memory chips and the incorporation of these techniques in the general 0.25 micron core technology efforts for future products. Work with a variety of highly skilled scientists and engineers in the development of sophisticated techniques for deposition, measurement and characterization of thin films. Work with tooling vendors in the development and selection of integrated processing cluster tools capable of integrating advanced cleaning and film deposition processes within a highly controlled environment. Perform advanced characterization and testing techniques for ultra-thin films. Develop and implement advanced pre-oxidation wafer cleaning techniques, conduct device integrity studies and reliability analysis for advanced semiconductor devices. Ph.D. in Chemistry plus 1 year in job or 1 year as a Research Assistant. One year experience must include research in the surface science of semiconductor materials, particularly the use of ultrahigh vacuum and surface spectroscopic techniques, including AES, XPS, UPS, XAES, and time of flight ion-scattering mass spectrometry. Research experience may be obtained at graduate or post-graduate level. 40hr/wk; 8:30 a.m. - 4:30 p.m.; \$53,015/yr. Send resume or letter, in duplicate to Jobs and Training Division, Vermont Department of Employment and Training, P.O. Box 488, Montpelier, VT 05601-0488, Reference Job Order No. 410442.

Senior Software Engineer; 40 hrs./wk.; 8:30 am-5:30 pm; \$48,000/yr. Job requires: Ph.D. degree in Mechanical Engineering OR Computer Engineering AND 1 yr. experience as a Mechanical Engineer OR University Research Assistant OR Computer Engineer. Job also reqs.: 1) Experience must include exp. using geometric modelling & computer graphics to design manufacturing software applications; 2) 1 grad. crse. in computer-aided research OR computer-aided design; 3) 1 college crse. in data structures; & 4) 1 grad. crse. in mathematical foundations for computer modelling & simulation. Job duties: Design, develop, & implement computer-aided manufacturing (CAM) software for advanced machine tools used in complex machining. Develop computer graphics for CAM software. Based on customer feedback, enhance software for use on production shop floor. Qualified applicants should send resume & verification of reqs. to: 7310 Woodward, Rm. 415, Detroit, MI 48202, Reference #73791. Employer Paid Ad.

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Systems Programming-Analyst. B.S. & M.S. in fields of computer science or business; one year experience; professional operation of: (1) DEC VAX/VMS; (2) IBM PC-compatible; (3) FORTRAN, COBOL and BASIC; (4) Fluent with at least four of the following development tools: ACMS, TDMS, FOCUS, VAX Rdb, DEC FORMS. \$31,400.00. Contact: GA. Dept. Labor, Job #GA 5509490, 1275 Clarendon Ave., Avondale Estates, GA. 30002.

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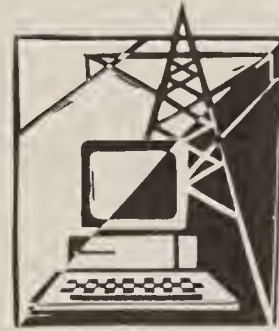
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Due to recent departmental planning studies, we have a significant backlog of technical and application development projects. We are currently seeking the following:

APPLICATION DEVELOPMENT AND SUPPORT

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Positions require at least 2 years of structured coding experience. Highly desired experience would include COBOL, CICS, DB2, DATACOM, and a background in a structured environment using a formal project life cycle methodology. Excellent communication and leadership skills are essential for these positions. A four-year degree is preferred.

DATA ANALYST

Position requires 4+ years experience in data administration, database administration, or systems development. At least 1-2 years experience in logical or conceptual data modeling is also required, as well as experience with CASE tools. Excellent interpersonal and communication skills are essential, and JAD facilitation skills are highly desirable. Some task or project management experience is also desirable. A four-year degree is preferred.

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Position requires 5+ years of experience in networking and data communications (e.g. network design, network management, and traffic analysis, etc.) in a multi-protocol environment (SNA, Token Ring, Ethernet). At least 2 years of experience in project management is also required. Candidate must possess strong verbal and written communication skills. A four-year degree is preferred.

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Tax free emoluments of approx. US\$ 48,200 p.a. Additional allowances for dependants. Initial contract for three years. Six weeks annual leave. Travel and removal expenses paid. Applicants should send their curriculum vitae quoting Vacancy Notice No. 91/059 to the Division of Personnel, International Atomic Energy Agency, P.O. Box 100, Wagramerstrasse 5, A-1400 Vienna, Austria, before 7 February 1992.

Technical Consultant/Systems Analyst; 40 hrs./wk.; 8:30 am-5:30 pm; \$37,000/yr. Job requires: Master's degree in Computer Science OR Computer-Based Information Systems AND 1 yr. exp. as an Applications Programmer. Job also reqs.: 1) Exp. must include 1 year exp. using structured analysis & design tools including dataflow & entity-relationship diagrams.; 2) Exp. must include 1 year exp. using 4GL/RDBMS in a DEC/VAX environment; 3) 1 grad. course in relational database; and 4) 1 grad. crse. in which C computer language on a UNIX platform was studied. Special reqs. 1) and 2) may be met concurrently during the same 1-yr. period. Job duties: Develop engineering information systems to validate manufacturing and assembly processes. Design Relational Database Systems which develop design verifications (an evaluation discipline used to establish design intent) & production validations for various parts of an automobile engine. Develop design analysis systems which allow for a single source of tracking design analysis requests made to analysis departments. Develop systems in a graphical user interface environment to be used across various work station platforms. Analyze applications & develop dataflow diagrams. Develop data models using relational database principles. Qualified applicants should send resume and verification of reqs. to: 7310 Woodward, Rm. 415, Detroit, MI 48202. Ref. #78491. Employer paid ad.

SENIOR MANUFACTURING SOFTWARE ENGINEER required. Analysis of Manufacturing Information Systems and design, development and implementation of manufacturing software in an HP3000/XL environment under MPE/XL. Utilize COBOL II, TURBOIMAGE database software, VPLUS, TRAX debugging tool, and knowledge of manufacturing systems and manufacturer information needs. Also use MM/3000 Manufacturing Software Package and POWERHOUSE. Will use analytical approach to manufacturing problems and will be responsible for the independent steps of analysis and software, design of software, and coding/implementation of software. Job site in Carrollton, Texas through mid 1992 with relocation likely every 6 to 12 months thereafter. Applicants required to have a Bachelors Degree or its equivalent in Computer Science and at least 3 years HP3000, TURBOIMAGE, VPLUS AND COBOL II Programming and Analysis experience. Experience must include three or more years with analysis, design and development of Manufacturing Software. Must also have work experience with MPE/XL and MM/3000, TRAX and POWERHOUSE. Must have proof of legal authority to work in the U.S. Annual salary will be \$52,000 per year for a 40-hour work week. Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, Austin, Texas 78778-0001, J.O. Number 6422069. This advertisement was paid by an Equal Opportunity Employment Employer.

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Please send resume and the names and addresses of three references by December 31 to: **Professor Robert G. Crozier, Chairman, Department of Computer Technology, IUPUI, 723 West Michigan Street, Indianapolis, IN 46202-5132.**

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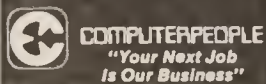
Technical Consultant, 40 hrs./wk., 9:00am - 5:00pm, \$29,830/yr. Analyze business customer requirements and specifications to design, develop, implement and test software for a wide range of information systems. Systems administration. Software maintenance/documentation. Network support. Programmer training. Tools: C/UNIX, Shell, COBOL, CBase, MVS, TSO/ISPF, JES 2, Starlan. B.S. in Computer Science as well as 1 year experience as a Technical Consultant or Systems Analyst required. Previous experience must include UNIX system administration. C, Shell, COBOL, MVS, TSO/ISPF, JES 2, Starlan. Must have proof of legal authority to work permanently in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, Illinois 60605. Attention: Martha Cartagena. Reference #V-IL-3443-X. NO CALLS. AN EMPLOYER PAID AD.

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Text Processing Engineer, 40 hrs/wk., 9:00am - 5:00pm, \$29,000/yr. Font development for several languages including Japanese, Chinese, and Korean. Text processing database management and maintenance. Tools: Post Script; dBase III; BASIC; PASCAL; Pagemaker; Freehand; Quark Express; Fontographer. B.S. in Electrical or Electronics Engineering as well as 2 years experience as a Text Processing Editor or Systems Analyst required. Previous experience must include: database management; Oriental word processing including font development. Must speak, read, and write one Oriental language. Must have proof of legal authority to work permanently in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF SECURITY, 401 South State Street - 3 South, Chicago, Illinois, 60605, Attention: Leon Donegan, Reference #V-IL-3470-D. NO CALLS. AN EMPLOYER PAID AD.

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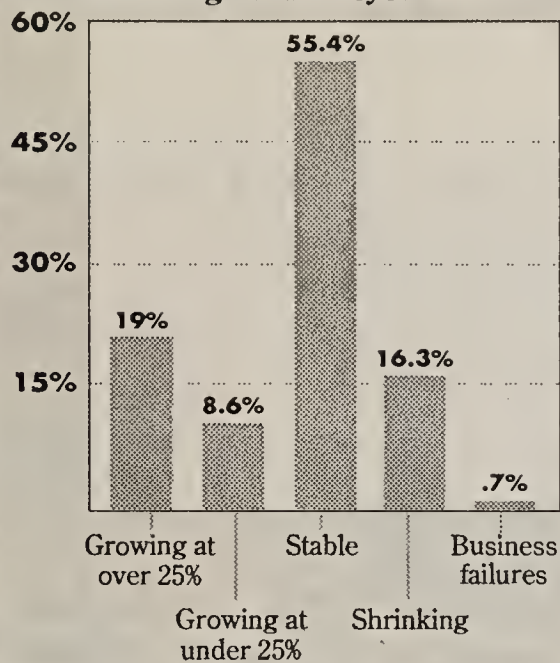
Corptech studied the employment growth over the past year at 406 telecommunications firms. The findings: Combined employment increased by 1,912, an average increase of 6.1%

Overall
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rate

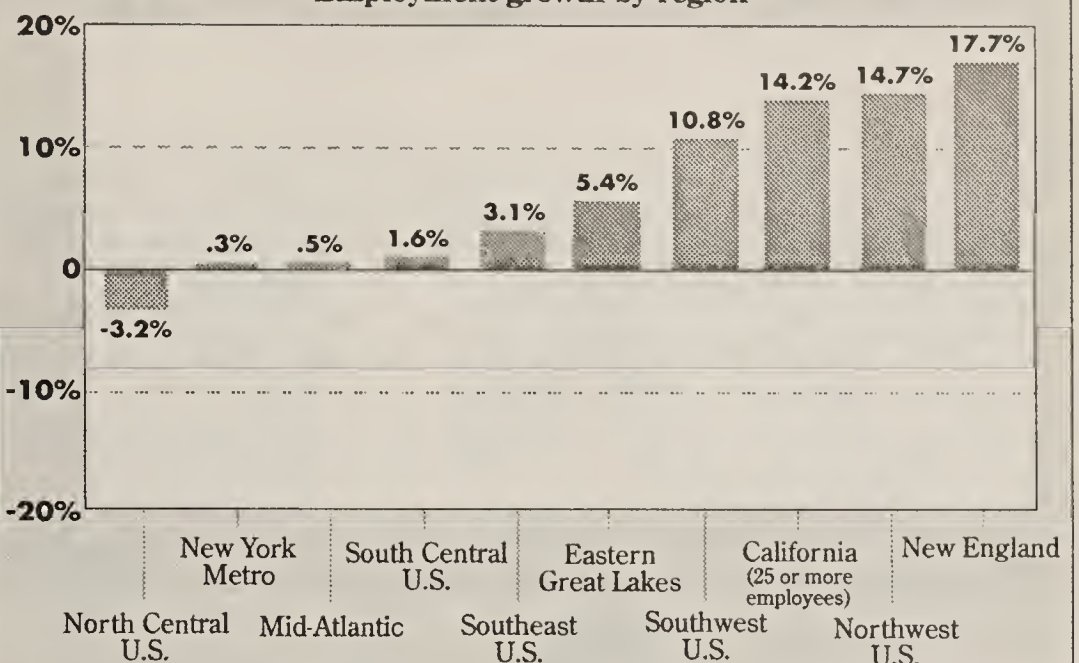
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Percentage of surveyed firms



Employment growth by region



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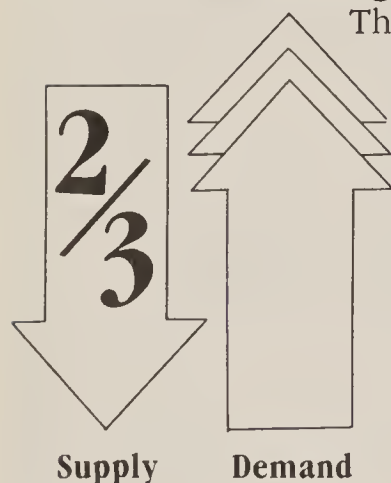
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who



would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

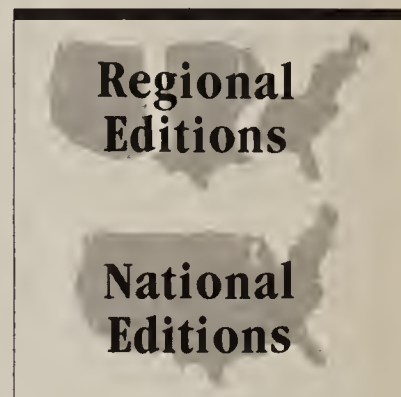
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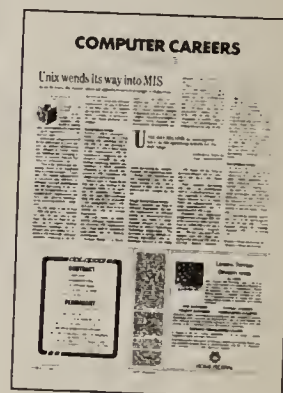
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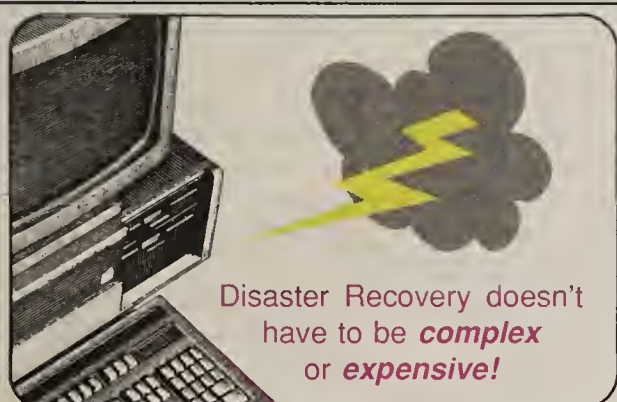
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Federal ruling limits boundaries of IS database copyright protection

BY HOWARD G. ZAHAROFF
SPECIAL TO CW

Information systems professionals who assumed that U.S. copyright law prevented others from copying their corporate databases or prevented them from using information contained in database licenses from third parties may need to rethink their views. This is because of a March U.S. Supreme Court decision that said, in effect, that copyright protection for compilations of data extends only to an original selection and arrangement of data and not to the data itself.

The case, *Feist Publications, Inc. v. Rural Telephone Services Co.*, was a suit by Rural, a public utility providing telephone services in Northwest Kansas, against Feist, a publisher of area-wide telephone directories.

Rural compiled its white pages by using information obtained from subscribers. Feist needed these listings to complete its own directories, but Rural refused to license them. Feist then acted without Rural's consent by taking Rural's white pages, removing the entries falling outside

of its geographic area, hiring personnel to verify Rural's data and publishing the end product in its own directory.

Rural sued for copyright infringement and said that Feist's employees should have traveled door to door or conducted a telephone survey to collect the information. Feist said such efforts were unnecessary because the directory information compiled by Rural was beyond the scope of copyright.

Many courts have adopted a "sweat of the brow" theory, granting information gatherers copyright protection in their compiled facts as a reward for their efforts.

In *Feist*, the Supreme Court rejected this approach, stating that copyright is not a tool by which a compilation author may keep others from using the collected facts or data.

Copyright protects only the elements that owe their origin to the compiler: the selection, coordination and arrangement of

facts. Because Rural's white pages were arranged alphabetically, the court ruled that it owned no rights to the listings.

This case could affect both creators and users of compiled data — from mailing lists, demographic information and parts catalogs to the new wave of compact disc/read-only memory and on-line databases. It could also affect rights with internal corporate data, such as customer lists, personnel files, vendor and contractor data and information about company products and services.

For example, if the creators and maintainers of these databases merely organized information in some unexceptional order, they probably could not claim any copyright protection for the compiled information. Even if they created an original selection and arrangement of this information, they still could not use the copyright laws to prevent third parties from reassembling the same basic data in a different format for

use in their businesses.

The *Feist* case does not give IS professionals blanket permission to copy from licensed databases nor does it mean IS professionals are unable to protect customer, supplier, personnel and other corporate data. Rather, the ruling reminds those who use and create compiled data that although copyright is one level of protection, other protections do exist.

For instance, if the compilation is a collection of separately copyrightable works — such as screen displays or written product reviews — these individual contributions generally would not be usable by others without the copyright owner's permission.

In addition, compilations of mere facts may be copyrightable if they exhibit an original selection and arrangement. This was acknowledged in *Feist* and confirmed two months later when the Second U.S. Circuit Court ruled that the form developed by George Kregos to report certain pitching statistics in subscribing newspapers was copyrightable.

Although the copyright act may not prohibit the use of the information contained in a compilation, it may prohibit the use of design features or structured segments of the compilation.

Even if copyright protection is unavailable, protection may exist under trade secrets, contract or unfair competition law. A company that properly maintains its databases as trade secrets — for example, by labeling all copies of such data as confidential and by

EVEN IF COPYRIGHT protection is unavailable, protection may exist under trade secrets, contract or unfair competition law.

limiting access to its employees who must use the data and who agree that the data is confidential — will usually have the backing of the law to prevent unauthorized uses of that data.

Similarly, if a company obtains a database under a license agreement that identifies the data as confidential and that prohibits its copying or use for any unlicensed purpose, the company's unauthorized use of the data might constitute both a breach of contract under general contract law and misappropriation under the laws of trade secrets and unfair competition.

Zaharoff is an attorney at the Boston office of Brown, Rudnick, Freed & Gesmer.



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AT Model 239	\$550	\$650	\$500
AT Model 339	\$750	\$1,000	\$700
PS/2 Model 30 286	\$900	\$1,050	\$850
PS/2 Model 60	\$900	\$1,500	\$900
PS/2 Model 80	\$2,250	\$2,600	\$2,150
PS/2 Model 90	\$4,300	\$4,600	\$4,100
Compaq Portable II	\$700	\$1,050	\$700
Portable 286	\$1,100	\$1,300	\$1,000
Portable 386	\$1,900	\$2,100	\$1,500
SLT 286	\$1,400	\$1,600	\$1,400
LTE 286	\$1,450	\$1,500	\$1,350
Deskpro 286	\$800	\$1,000	\$700
Deskpro 386/20	\$2,000	\$2,300	\$1,900
Apple Macintosh Plus	\$750	\$975	\$700
SE	\$950	\$1,050	\$950
IIX	\$3,500	\$3,600	\$3,400
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INDUSTRY ALMANAC

RECOMMENDATION CHANGES

UPGRADED FROM SELL TO BUY: Apple Computer, Inc. (Prudential Securities, Inc.). Company expenses fell 6% for fourth-quarter 1991; financials were better than anticipated. Apple's core business is estimated to grow 6% next year vs. an overall desktop market expanse of only low single-digit improvement in 1992. New Apple computers will probably bring in about \$500 million in sales in the coming year, for a total growth rate of 15%.

UPGRADED FROM NEUTRAL TO BUY: Adaptec, Inc. (Alex. Brown & Sons, Inc.). Renewed momentum in the company's mainstream small computer systems interface host adapter business has made Adaptec one of the leading vendors in that high-growth sector. Adaptec's new imaging products, such as laser printer controllers, should start to contribute to earnings in mid-1992.

UPGRADED FROM NEUTRAL TO BUY: Sequoia Systems, Inc. (Alex. Brown & Sons). The company, founded in 1981 but lacking commercial products until 1987, closed fiscal 1991 with a 30% sales growth. It is gaining market share over competitors in the fault-tolerant, on-line transaction processing segment. Sequoia is set up to capitalize on strong partner relationships, including those with Hewlett-Packard Co. and several Asian companies.

UPGRADED FROM SELL TO HOLD: Mips Computer Systems, Inc. (Prudential). Mips stock plunged after the company recently announced that technology license revenue will be significantly below quarterly expectations. Now, it may be too late to sell, hence the hold rating. Mips is modifying its business model, turning to a more desktop-oriented systems strategy, adding to investment uncertainty.

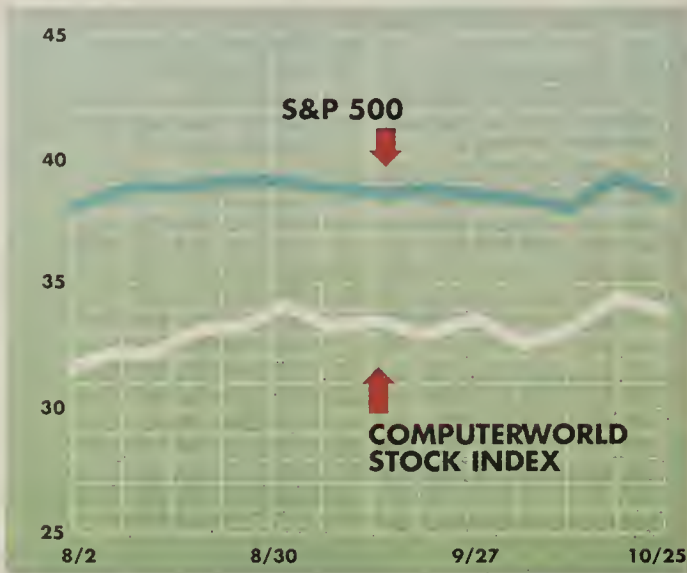
DOWNGRADED FROM ATTRACTIVE TO NEUTRAL: AST Research, Inc. (Mabon Securities Corp.). Strong momentum continues in AST's notebook line, but intense pricing pressure from competitors looms. For example, Compaq Computer Corp. cut tags on some of its products and unveiled others priced within 10% of AST's comparable offerings.

DOWNGRADED FROM BUY TO HOLD: Cognos Corp. (Volpe, Welty & Co.). Financial performance has improved dramatically during the past six quarters, with consistent gains in sales growth. Cognos is one of the leading suppliers of fourth-generation language and computer-aided software engineering tools for machines from Digital Equipment Corp. and HP. However, Cognos will likely hit a period of lower revenue growth as it expands into the IBM Application System/400 and Unix relational database markets.

DOWNGRADED FROM OUTPERFORM TO NEUTRAL: Autodesk, Inc. (Shearson Lehman Brothers, Inc.). The company is undergoing major transitions on many fronts, including management reorganizations — the company's president, Al Green, retired from that position but remains chairman of the board — and changing its distribution strategy by strengthening value-added reseller and dealer channels. Autodesk could emerge as a stronger computer-aided design and manufacturing company, but in the meantime, investment quality is uncertain.

KIM S. NASH

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Earnings reports guided technology stocks again last week, with some big players seeing share prices dip. Compaq Computer Corp. announced a \$135 million third-quarter loss last week; shares slipped 1/2 a point to 33. Mips Computer Systems, Inc. also reported red figures for the quarter, and shares fell 1/2 a point to 9 1/4.
- Personal computer makers saw action as Comdex/Fall '91 roared in Las Vegas. Clone-maker AST Research, Inc. careened 5 1/4 points for the week, closing Thursday at 22 3/4, while rival Dell Computer Corp. dropped 3 1/2 points to 27 3/4.
- Software stocks were mixed. Lotus Development Corp. fell 3 points to 26 3/4, while Oracle Corp. added 1 3/8 points to 15 1/2. An earnings surprise from Informix Software, Inc. drove up share prices by 3 3/8.
- Compression Labs, Inc. rose 5/8 of a notch to 25 1/2 after reporting positive third-quarter numbers last week. Picturitel Corp. picked up 2 3/4 points to 40 1/2.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, OCTOBER 25, 1991

TOP PERCENT GAINERS

Informix Corp.	44.74
Artel Communication Corp.	20.87
Sungard Data Sys.	20.00
Analog Devices Inc.	16.13
Interleaf Inc.	12.70

TOP PERCENT LOSERS

Cognos Inc.	-30.43
Software Publishing Corp.	-25.32
Knowledgeware Inc.	-18.52
AST Research Inc.	-17.37
Cabletron Systems	-16.18

TOP DOLLAR GAINERS

Informix Corp.	4.25
Sungard Data Sys.	2.88
Digital Equipment Corp.	2.75
Cray Research Inc.	2.38
Comdisco Inc.	2.00

TOP DOLLAR LOSERS

Cabletron Systems	-8.38
Adobe Systems Inc.	-6.00
Autodesk Inc.	-5.38
Cognos Inc.	-5.25
Software Publishing Corp.	-4.88

Exch	52-Week	Range	Oct. 25	Wk Net	Wk Pct
			Close	Change	Change

Communications and Network Services Off 0.51%

OTC	10.50	5.50	3 COM Corp.	9.63	-0.13	-1.28
NYS	69.75	55.75	American Info Techs Corp.	61.38	1.00	1.66
NYS	40.38	29.00	AT&T	38.00	-1.00	-2.56
OTC	4.13	0.88	Artel Communication Corp.	1.81	0.31	20.87
NYS	56.25	43.00	Bell Atlantic Corp.	44.63	-0.50	-1.11
NYS	56.25	46.13	Bellsouth Corp.	47.50	0.75	1.60
NYS	52.88	21.38	Cabletron Systems	43.38	-8.38	-16.18
OTC	25.88	8.25	Compression Labs Inc.	24.25	-0.75	-3.00
OTC	5.13	2.00	Data Switch Corp.	2.50	0.13	5.26
NYS	21.50	9.25	Digital Comm. Assoc.	15.38	-1.38	-8.21
OTC	25.25	14.00	Dynatech Corp.	17.00	1.50	9.68
OTC	12.38	5.00	Fibronix Int'l Inc.	6.00	0.00	0.00
OTC	20.75	6.50	FileNet Corp.	19.38	-1.13	-5.49
OTC	3.75	2.00	Gandalf Technologies Inc.	2.06	-0.19	-8.31
NYS	3.50	1.63	General Datacomm Inds.	3.50	0.13	3.70
NYS	33.50	27.13	ITT Corp.	31.50	-0.13	-0.40
NYS	63.00	42.50	MCI Communications Corp.	55.50	-2.50	-4.31
OTC	32.50	17.88	Microcom Inc.	28.38	-0.38	-1.40
OTC	12.00	3.25	Network Equipment Tech.	11.00	0.75	7.32
NYS	13.88	4.00	Network General	13.88	0.88	6.73
OTC	14.63	4.50	Network Systems Corp.	12.50	-1.88	-13.04
NYS	18.88	8.13	Northern Telecom Ltd.	16.75	0.50	3.08
OTC	41.00	24.00	Novell Inc.	40.63	-0.25	-0.61
OTC	47.25	11.13	Nynex Corp.	42.50	-3.00	-6.59
NYS	77.63	67.00	Pacific Telesis Group	75.88	-0.38	-0.49
NYS	47.00	38.50	Penril Data Comm. Ntwks.	39.88	-0.50	-1.24
OTC	11.63	4.25	Picturitel Corp.	8.00	-0.25	-3.03
OTC	40.50	8.50	Scientific Atlanta Inc.	38.25	0.25	0.66
NYS	17.88	8.88	Southwestern Bell Corp.	13.63	0.13	0.93
NYS	57.75	49.00	United Telecom	56.38	-1.00	-1.74
NYS	31.50	20.63	US West Inc.	23.00	0.38	1.66
NYS	40.75	34.00		35.00	0.00	0.00

Computer Systems Off 3.30%

OTC	20.75	6.50	Advanced Logic Research	12.00	-1.75	-12.73
ASE	17.88	10.50	Amdahl Corp.	13.88	-0.38	-2.63
OTC	73.25	29.25	Apple Computer Inc.	51.25	-3.75	-6.82
OTC	9.13	2.75	Archive Corp.	3.75	-0.25	-6.25
OTC	32.75	9.25	AST Research Inc.	22.00	-4.63	-17.37
NYS	9.38	4.00	Bolt, Beranek & Newman	5.13	0.13	2.50
NYS	21.63	6.25	Commodore Int'l	13.75	0.25	1.85
NYS	74.25	29.88	Compaq Computer Corp.	30.25	-3.63	-10.70
OTC	2.50	0.38	Computer Automation Inc.	1.50	-0.25	-14.29
NYS	13.75	6.75	Control Data Corp.	9.63	0.38	4.05
NYS	19.75	8.38	Convex Computer	12.00	0.00	0.00
NYS	45.38	23.00	Cray Research Inc.	45.38	2.38	5.52
NYS	22.38	3.50	Data General Corp.	20.00	0.13	0.63
NYS	4.38	1.00	Datapoint Corp.	3.13	-0.38	-10.71
OTC	36.25	9.63	Dell Computer Corp.	27.25	-3.00	-9.92
NYS	83.00	46.50	Digital Equipment Corp.	61.38	2.75	4.69
NYS	28.88	14.13	Harris Corp.	26.13	1.88	7.73
NYS	56.63	24.88	Hewlett-Packard Co.	50.25	0.13	0.25
NYS	139.75	94.00	IBM	97.88	-2.50	-2.49
OTC	12.00	7.75	Information Int'l	9.50	0.75	8.57
NYS	145.75	106.00	Matsushita Electronics	115.75	-0.75	-0.64
OTC	20.88	7.25	MIPS Computer Systems	9.38	-0.25	-2.60
NYS	110.00	44.50	NCR Corp.	108.00	0.00	0.00
OTC	29.50	10.75	Pyramid Technology	16.25	-0.25	-1.52
OTC	20.00	7.50	Sequent Computer Sys.	11.25	0.25	2.27
NYS	47.25	18.00	Silicon Graphics	41.38	-2.38	-5.43
NYS	45.88	17.38	Stratus Computer Inc.	40.00	-4.25	-9.60
OTC	38.63	15.38	Sun Microsystems Inc.	24.25	-2.50	-9.35
NYS	17.63	8.88	Tandem Computers Inc.	12.13	-1.00	-7.62
OTC	4.75	1.25	Tandon Corp.	2.06	0.00	0.00
NYS	36.50	23.38	Tandy Corp.	28.13	-1.75	-5.86
OTC	24.50	6.75	Teradata	19.38	-2.75	-12.43
NYS	6.13	1.38	Ultimate Corp.	2.88	0.13	4.55
NYS	7.00	2.00	Unisys Corp.	4.13	-0.25	-5.71
ASE	5.75	2.00	Wang Labs Inc. (b)	2.75	0.00	0.00

Software & DP Services Off 2.23%

OTC	63.00	17.00	Adobe Systems Inc.	49.63	-6.00	-10.79
OTC	12.25	3.50	Aicorp	4.88	-0.38	-7.14
OTC	59.88	23.13	Aldus Corp.	41.00	-2.25	-5.20
OTC	28.50	14.13	American Mgmt. Systems	18.50	-2.50	-11.90
OTC	17.25	9.00	American Software Inc.	14.25	-1.00	-6.56
NYS	4.63	1.50	Anacomp Inc.	3.13	-0.13	-3.85
OTC	18.25	11.88	Analysts Int'l	15.88	0.38	2.42
OTC	16.63	5.13	Ashton Tate	16.38	0.00	0.00

Exch	52-Week	Range	Oct. 25	Wk Net	Wk Pct
			Close	Change	Change

OTC	13.00	4.38	ASK Computer Sys.	11.13	-1.13	-9.18
NYS	39.75	24.75	Auto Data Processing	37.13	-1.88	-4.81
OTC	62.25	36.00	Autodesk Inc.	42.50	-5.38	-11.23
OTC	35.50	18.50	BGS Systems Inc.	33.75	-0.50	-1.46
OTC	55.00	19.13	BMC Software Inc.	52.50	-1.00	-1.87
OTC	16.00	8.75	Boole & Babbage Inc.	11.88	1.25	11.76
OTC	64.25	22.00	Borland Int'l	48.00	-0.63	-1.29
OTC	20.88	6.63	Cognos Inc.	12.00	-5.25	-30.43
NYS	11.13	6.25	Computer Associates	9.00	0.88	10.77
OTC	17.75	9.00	Computer Horizons	9.63	0.63	6.94
NYS	73.25	40.25	Computer Sciences	67.00	-0.25	-0.37
OTC	11.25	6.63	Computer Task Group	8.75	-0.25	-2.78
OTC	22.75	13.00	Comshare Inc.	14.75	-1.38	-8.53
OTC	13.25	3.75	Corporate Software	10.13	0.13	1.25
NYS	54.63	31.25	General Motors E (EDS)	52.63	-1.38	-2.55
OTC	18.75	7.25	Goal Systems Int'l	10.75	-0.50	-4.44
OTC	7.00	1.88	Hogan Systems Inc.	5.75	0.00	0.00
OTC	29.25	7.75	Information Resources	22.50	-3.63	-13.88
OTC	13.75	2.63	Informix Corp.	13.75	4.25	44.74
OTC	3.63	1.38	Intellipoint Inc.	1.53	-0.22	-12.51
OTC	31.50	10.75	Intergraph	18.75	0.25	1.35
OTC	8.88	3.00	Interleaf Inc.	8.88	1.00	12.70
OTC	13.50	6.88	Intersolv	13.25	-0.25	-1.85
OTC	43.25	10.50	Knowledgeware Inc.	11.00	-2.50	-18.52
OTC	45.00	17.25	Legent Corp.	32.75	-0.25	-0.76
OTC	40.75	14.75	Lotus Development	27.50	-1.50	-5.17
OTC	19.00	9.25	Mentor Graphics	13.75	0.13	0.92
OTC	32.00	9.75	Micrografx	15.25	-1.00	-6.15
NYS	92.25	41.38	Microsoft Corp.	89.50	-0.50	-0.56
OTC	15.75	4.00	On Line Software Int'l	15.75	0.00	0.00
OTC	15.38	4.88	Oracle Systems	15.38	1.25	8.85
NYS	16.00	7.00	Panosophic Systems	15.88	0.00	0.00
OTC	10.00	1.25	Phoenix Technologies	6.75	-0.75	-10.00
OTC	21.25	9.00	Platinum Technology	18.75	-2.25	-10.71
NYS	57.50	36.00	Policy Management Sys.	54.75	-1.00	-1.79
NYS	26.38	11.50	Reynolds & Reynolds	26.25	0.13	0.48
OTC	13.75	6.75	Ross Systems	12.25	-1.00	-7.55
OTC	27.50	15.50	SEI Corp.	23.00	-2.00	-8.00
OTC	23.38	13.88	Shared Medical Systems	21.38	0.13	0.59
OTC	35.25	12.00	Software Publishing Corp.	14.38	-4.88	-25.32
NYS	18.25	6.75	Sterling Software	18.25	1.38	8.15
OTC	18.25	9.50	Sungard Data Sys.	17.25	2.88	20.00
OTC	69.50	18.75	Symantec Corp.	67.75	-0.88	-1.28
NYS	12.63	4.50	System Center Inc.	12.63	1.00	8.60
OTC	37.25	12.50	System Software Assoc.	19.75	-2.00	-9.20

Semiconductors Off 0.81%

NYS	14.25	3.75	Advanced Micro Devices	10.50	-0.63	-5.62
NYS	12.50	5.50	Analog Devices Inc.	9.00	1.25	16.13
OTC	13.50	6.00	Chips & Technologies	7.88	-0.25	-3.08
OTC	59.25	32.00	Intel Corp.	42.50	-1.50	-3.41
NYS	12.50	5.38	LSI Logic Corp.	7.75	-0.25	-3.13
NYS	19.13	6.75	Micron Technology	16.63	0.63	3.91
NYS	71.25	45.75	Motorola Inc.	62.50	1.38	2.25
NYS	8.38	3.13	National Semiconductor	5.25	0.00	0.00
NYS	47.63	22.50	Texas Instruments	30.00	-1.00	-3.23
OTC	12.25	3.50	VLSI Technology	6.75	-0.75	-10.00
OTC	16.75	4.75	Weitek	6.75	-0.25	-3.57
ASE	6.75	2.50	Western Digital Corp.	3.00	0.00	0.00

Peripherals & Subsystems Off 3.20%

OTC	2.75	0.88	Apertus
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Spotlight on backup after NYSE outage

BY JOHANNA AMBROSIO
CW STAFF

NEW YORK — Last week's 24-minute trading halt at the New York Stock Exchange underscores the importance of backup in the age of distributed computing, observers said.

The Oct. 22 outage, the third in the last two years, was caused by a momentary voltage dip that cut electrical power by 43%. As a result, some of the exchange's trading-floor computers were frozen, and the Big Board halted trading until power was restored. The mainframe computers, which are housed in a separate facility, were not affected, the exchange said.

The frozen computers suffered no hardware damage, an exchange spokeswoman said, and no orders were lost. She said that as a result of the problem, the Big Board "will take necessary steps [to] reinforce" the affected trading-floor systems "as soon as possible." She would not disclose any further information about what those steps might be, and exchange information systems executives were not available for comment.

The electrical dip was felt by much of Manhattan and was caused by a short-circuited switch, according to a spokesman at Consolidated Edison, New York's electrical utility

company.

As at most large IS shops, industry watchers said, the exchange's largest computers are well-protected against power-supply spikes and other kinds of problems with uninterruptible power supplies (UPS) and backup computers. But as more computing power moves out of the computer center and into distributed systems, backup systems have not always followed.

"It's an ongoing and serious problem," said Robert Campbell, president of Advanced Information Management, Inc., a consultancy in Woodbridge, Va. "The extensions of UPS and backups are not made out to those computers on the trading floor. It's a need not yet recognized because of oversight or because of budgetary issues."

No mandatory rules

The two primary regulatory agencies for exchanges, the Securities and Exchange Commission (SEC) and the Commodities Futures Trading Commission, do not have mandatory rules that cover computer backup. The SEC, however, has issued voluntary guidelines.

One of those suggestions is that exchanges hire independent auditors to issue reports about what contingency plans and equipment are in place and what is planned. During the next year,

the SEC will examine the reports to see how the exchanges are complying with the guidelines.

Some exchanges have already begun extensive disaster-recovery programs that extend to the trading floor. The Chicago Board of Trade recently installed a fault-tolerant local-area network on its agricultural floor. "All new technology will be hooked into that LAN," said Glen Belden, vice president of IS. If one trading pit goes down, the others will stay up, he said.

Additionally, he said, the Chicago Board of Trade and the Chicago Mercantile Exchange are planning to back each other up in case of a massive failure at either place. One part of that backup is a fiber-optic link, now being tested, that connects both exchanges' Tandem Computers, Inc. computers.

"We assume we'll be required [by the regulatory agencies] to do more," Belden said. "But the exchange has already begun issuing its own requirements."

The NASDAQ exchange has duplicate computer centers: Its primary one is in Trumbull, Conn., and a second one is in Rockville, Md.

The Securities Industry Automation Corp., which runs the mainframe computers for both the American and New York exchanges, is building a duplicate data center in Brooklyn, N.Y.

"People tend to ignore backup until they take a hit," said Arthur Markowitz, senior vice president of operations at the Commodities Exchange. "It's like insurance; you don't buy a policy until you get sick."

Prodigy on defensive over messages

BY CHRISTOPHER LINDQUIST
CW STAFF

NEW YORK — Prodigy Services Co. is once again embroiled in controversy, this time over its response to seemingly anti-Semitic remarks posted to the on-line service run by IBM and Sears, Roebuck and Co.

The Anti-Defamation League (ADL) issued a statement on Oct. 18 expressing displeasure with Prodigy's allowing what it deemed "anti-Semitic and anti-Israel messages" to be posted on public bulletin boards.

The ADL called attention to postings that suggested Israel was the cause of Middle East problems and that Jews held a grip on U.S. business and government as well as those that claim the Holocaust may not have occurred.

The ADL said it had been in a dialogue with Prodigy officials for three months and had sent a letter to Prodigy President and Chief Executive Officer Theo-

postings for "offensive language." Postings can be denied if they direct insults at members, use profanity or promote goods or-services.

Henry Heilbrun, senior vice president of Prodigy services, said Prodigy has not changed its policy but has instead "amplified" its policy to include "blatant expressions of bigotry, racism and hate" as being insulting to other members. He also said Prodigy's policies were "designed to balance both our family service and the principles of free expression."

Jeffrey Sinensky, director of the ADL's civil rights division, said the ADL welcomed Prodigy's "amplification." However, he said Prodigy officials had indicated some messages deemed inappropriate by the ADL may still be posted by Prodigy.

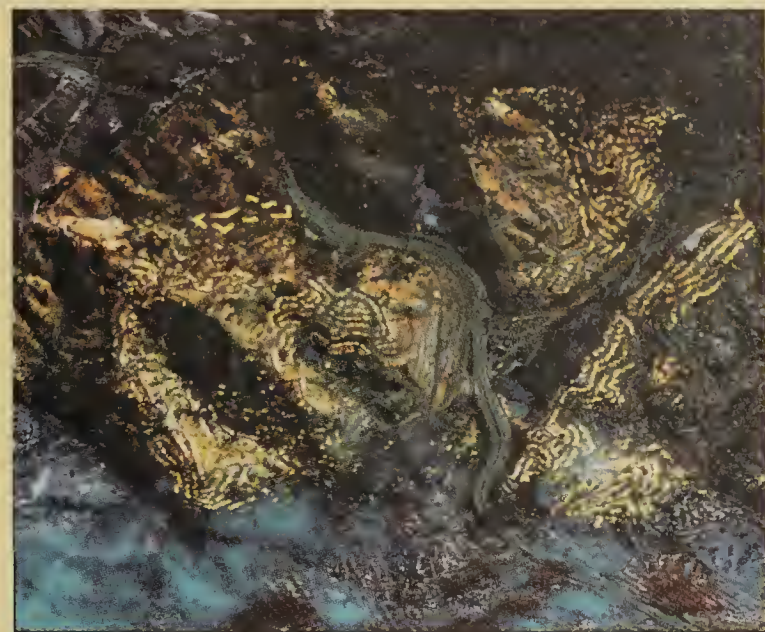
Not exactly prodigal at PRODIGY

Sept. 1990	Prodigy announces new charges for users sending more than 30 E-mail messages per month.
Oct. 1990	Prodigy suspends some E-mail pricing critics for "harassing" other users.
April 1991	Some users raise complaints that Prodigy may be using the service to gain access to data on user systems. Prodigy strongly denies the charge.
July 1991	Anti-Defamation League begins discussing "offensive messages" with Prodigy officials.
Oct. 1991	Anti-Defamation League issues press release condemning Prodigy's reaction to its concerns. Prodigy responds by "amplifying" public posting policy.

dore Papes on July 31. However, the ADL indicated that it had not received a satisfactory response from Prodigy during that time.

Prodigy officials stated they maintain a policy of monitoring

Tracking the flames



NASA Ames Research Center

Computer technology captured the horror of last week's firestorm in the hills above Oakland, Calif., which killed at least 22 people and left hundreds injured and thousands homeless. This digital image, which shows an area two miles wide, was acquired by a military C-130 aircraft from the NASA Ames Research Center near Mountain View, Calif. The aircraft flew over the scene 22 hours after fire broke out to help firefighters track the blaze's movement. The data was processed by a Hewlett-Packard Co. HP 3000 computer that hosts special imaging software called Interactive Digital Image Manipulation System. Processing the image took approximately an hour.

Picturatel, IBM plan future videoconferencing systems

BY KIM S. NASH
CW STAFF

PEABODY, Mass. — Picturatel Corp. last week planted seeds for new desktop videoconferencing systems when it signed a joint marketing agreement with IBM.

Potential users will be unable to pluck fruit from the deal until the second half of next year or early 1993. Intel Corp. — partnered with IBM and Picturatel under separate agreements — is not expected to perfect and produce the required video microprocessor until mid-1992, a Picturatel executive said.

"Products should come six to nine months after that," said Jim Kedersha, an analyst at brokerage firm Cowen & Co. in Boston.

Meanwhile, Picturatel demonstrated a prototype of the as-yet-unnamed desktop system at Comdex/Fall '91.

A Personal System/2 Model 80 equipped with camera and microphone transmitted live, two-way video. An IBM M-Motion Video Adapter/A board inside the computer digitized the full-motion images on the fly and translated the signals to IBM Video Graphics Array-compatible graphics.

Two public-switched, 56K-byte lines carried the two-way feed to and from the Las Vegas show.

Under the new agreement, IBM and 10 large U.S.-based IBM customers in various vertical industries will test the prototypes and give feedback about "what desktop users want in a videoconferencing system," said Rob Mitro, a Picturatel vice president. The 10 user companies have not yet been chosen.

Price a factor

Affordability will determine whether the new system succeeds, Kedersha said. Picturatel's videoconferencing room system, announced in July, costs about \$20,000, including various individual pieces of equipment, such as large screens, cameras, electronic components and software. The desktop system will cram similar functions on either a single chip or a series of chips from Intel, Mitro said.

"Within five years, the whole thing will cost \$5,000," he said.

The IBM agreement comes one week after Picturatel publicized a partnership with Nynex Corp. to bring videoconferencing products to Integrated Services Digital Network services in the Northeast.

Meanwhile, rival Compression Labs, Inc. has worked with AT&T since 1989 and recently announced it will co-develop a videophone product with the long-distance carrier.

Lotus hot on pen-based computing trail

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. pulled back its Comdex/Fall '91 plans to announce a new division devoted to pen-based computing, but that is no reflection on the developer's enthusiasm for the nascent market.

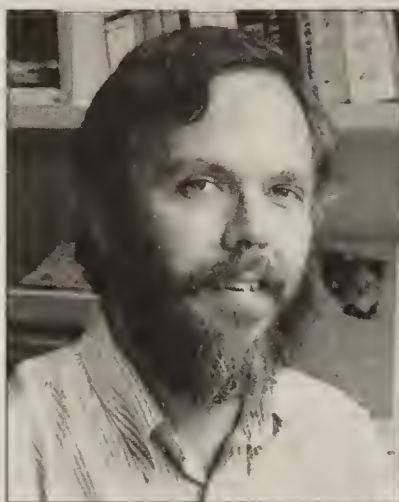
A spokeswoman said the company is going forward with its plans to port its suite of applications to pen-based platforms. "We believe pen computing will be one of the highest growth markets in the '90s," said David Reed, Lotus' chief scientist, adding that the company intends to be positioned to take a leadership role — hence the Pen Division, which Reed will head up.

Moreover, Lotus is "open" to buying pen-related technology but currently has no such plans, Reed said.

Two-team approach

In a recent interview, Reed said that by using separate teams, Lotus will develop pen extensions for both Microsoft Corp.'s Windows and Go Corp.'s proprietary Penpoint operating system but will not necessarily develop the same products for each.

Reed indicated that he leans more toward Penpoint, in part because it is targeting the most obvious market for pen-based computing: custom applications for field workers who are not necessarily computer-literate.



Lotus' Reed: Lotus open to buying pen-related technology

One drawback is that applications must be rewritten to take advantage of the operating system.

Microsoft's Windows for Pen Computing reportedly offers developers a fairly quick, easy port.

That said, Reed suggested the argument about Microsoft should not be about how easy it is to port something but whether existing Windows applications are valuable in the pen environment.

Reed wondered why a user happy with "a nice Windows-based desktop" would use a pen-based system.

Reed said that he sees the market addressed by Microsoft as one in which users already own personal computers and laptops and have a large investment in their office productivity applications.

"The pen is important here

mostly as a way of running the same applications. It is quite different from a market that might address totally new uses" of computers, Reed explained.

That corner of the pen market is "much more valuable to people who are not attracted by Windows," he said. "I would say Go would provide the solution if it could provide a good set of applications that would make addressing that market easy," he predicted.

Reed said he sees pen systems as appealing to existing laptop users, particularly the more dissatisfied ones: "a large class" of managers who rarely find themselves in a fixed location and who rarely have the time to sit in front of a computer terminal; workers whose jobs revolve around information-intensive tasks, such as filling out forms; and traveling salespeople.

PC compatibility key to Apple's notebooks

BY JAMES DALY
CW STAFF

LAS VEGAS — A DOS-related feature in Apple Computer, Inc.'s new slim and trim Powerbooks could ironically make them among the best portables in the IBM Personal Computer-compatible market.

The Powerbook trio unveiled at last week's Comdex/Fall '91 offers an attractive lure to DOS users looking for a spiffy new portable PC: All of the notebook-size machines have or can accommodate Apple's Superdrive, a 1.4M-byte drive that can read, write and format DOS and OS/2 disks.

That has opened up a whole new option to some buyers. "We're a DOS shop looking to buy portables, so [the Powerbook] certainly gives us another option to think about," said Stephen Costello, vice president of systems development at The NPD Group, a research company in Port Washington, N.Y.

Pretty pricey

Grabbing DOS converts could still prove a slippery task, though. The cost of the Powerbooks — between \$2,299 and \$4,599 — is about 20% more than comparably equipped DOS portables, and that extra amount could be tough to justify in tight economic times. "If I pay a premium price [for the Powerbook], I want a premium product, and right now, this offers little that I can't get in a DOS portable for a lot cheaper," said Felix Nedorezov, president of the FID Corp., an auto industry consulting firm in Rochester Hills, Mich.

Users also insisted on a high accuracy rate in the DOS-to-

Macintosh data conversion. "If the compatibility rate is not 100%, I can't consider it," said Larry Decklever, president of Minneapolis-based Benchmark Laboratories, Inc., a software quality assurance lab.

Accuracy of the data transfer could be limited by application type, said Rick Christjansen, manager of technical support at Manville Corp. in Denver. Christjansen, who has worked with the Superdrive in other Macintosh models, said the straight conversion of identical applications that appear in the DOS and Macintosh world, such as converting a document prepared with Microsoft Corp.'s Word, is generally reliable and easy. But the changeover of presentation packages or macros presents more problems.

"There's no question that there'll be limitations, but if the applications line up on a word processing package, for instance, I think [the Powerbooks] make a great alternative," said Mark Clawson, a member of the intelligence consulting team of the Stealth Fighter Program at Nellis Air Force Base in Nevada.

Third parties also offer help in data conversion tasks. For example, Insignia Solutions, Inc.'s SoftPC allows users to run DOS in a window alongside the Macintosh applications.

Landing a major share in the portable market could still prove difficult for Apple, however. Dozens of computer makers have introduced IBM-compatible notebook computers in the past year, and dozens more came out at Comdex. The Powerbooks will initially be tough to get. General availability is not expected until early next year, Apple said.

Novell, Kodak plan imaging software

BY JIM NASH
CW STAFF

PROVO, Utah — Following IBM and Lotus Development Corp., Novell, Inc. last week disclosed that it will work with Eastman Kodak Co. to make imaging an integral part of its networking software.

Novell and Kodak are collaborating to give Netware users the ability to store and manipulate images across local-area and enterprise networks.

Kodak's Desktop Document Imaging Group will work with Novell to develop image processing, mass storage and object management technology to add to Netware.

Kodak will also provide Novell with application programming interfaces and Netware loadable module tools that will allow Netware to handle images more efficiently.

Specific product information and pricing will be released at a later date, both companies said.

The partnership is expected to provide a major boost to Kodak's so far unsuccessful imaging strategy, since Netware is far and away the leading installed personal computer network environment, according to analysts.

Despite a lack of specifics about the partnership, information systems managers expressed enthusiasm about the Novell/Kodak partnership.

"We'd love to see Novell do something with" imaging, according to Nancy Raley, IS director at Calfarm Insurance Co. in

Sacramento, Calif.

Acknowledging the immense paper-shuffling job done daily at Calfarm, Raley said she has been keeping an eye on the technology for some time. "If I want to put imaging workstations on my desktops today, I'd have to put together a separate network to do it," she explained.

Richard Retin, senior technical analyst at San Francisco-based Wells Fargo & Co., agreed. Networked imaging could grow to at least match optical character recognition technology available today, he noted.

Get the picture

After numerous unsuccessful tries at cracking the document imaging market on its own, Kodak is counting on strategic partners to help pave the way.

- **Lotus:** Working with the applications software giant to add imaging capabilities to its Notes groupware product.
- **IBM:** Strengthening the imaging functionalities of the industry leader's Imageplus product for OS/2.
- **Novell:** Helping graft imaging capabilities to Netware.

Synoptics takes cleaver to 10Base-T prices

BY JOANIE M. WEXLER
CW STAFF

SANTA CLARA, Calif. — Wiring hub maker Synoptics Communications, Inc. last week slashed prices on its entire 10Base-T product line by nearly 40%, a move that could make the technology more attractive to companies expanding to branch sites.

The firm aims to grab still-plentiful 10Base-T market share as companies move small and midsize Ethernet local-area networks out to corporate branches and provide price incentives to those users looking to mix 10Base-T, Token Ring and Fiber

Distributed Data Interface within one managed hub, said Dave Cote, Synoptics' director of segment marketing.

10Base-T is a communications standard that was sanctioned last year for running 10M bit/sec. Ethernet LANs over widely installed unshielded twisted-pair wiring.

Synoptics user Ken Starkey, associate director of communications at Bear, Stearns & Co. in New York, agreed that the move would be useful in remote sites around the country where the company wants to use a single platform to support different LANs. "These are locations where we need to lower price

points but maintain flexibility," he said.

Janet Hyland, director of network strategy research at Forrester Research, Inc. in Cambridge, Mass., agreed. "People need cheap, remotely managed connections in their branch offices."

To date, Synoptics has had among the highest list prices for 10Base-T connections. Its price cuts render them "back in the ballgame," Hyland said. Per-port prices have dropped to about \$83 in a 10Base-T-only concentrator and to about \$124 in the firm's manageable modular concentrator, which also supports other LAN topologies.

Compaq founder out the door

CONTINUED FROM PAGE 1

Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass., predicted that Compaq would need six months to a year to turn itself around, and the board wanted to send a message to employees to gird themselves for a major change.

"All the other companies in the Big Three [IBM, Apple Computer, Inc. and Compaq] have been through big restructurings; they're the last," Stephen said.

No more big changes

Pfeiffer said he foresaw no major changes in Compaq's near future, other than what was announced on Wednesday (see story page 6).

"We have been working on our corporate strategy and individual business strategies for several months now, and this organizational change is not a reason to make dramatic shifts in what steps we've been taking," Pfeiffer said.

Michael Swavely, whom

Pfeiffer replaced when Swavely took a leave of absence in January, said his reaction was mixed.

"Certainly, I think it's time for a change at Compaq, but I would have to say the announcement this morning was inappropriately handled," Swavely said. "It's obvious it was a very hasty decision, and I would say that to treat Rod that way is just not called for."

Swavely also raised doubts about Pfeiffer's management style and leadership abilities. Pfeiffer "manages by intimidation, as opposed to consensus management," Swavely said. "I don't think a lot of people at Compaq are accustomed to it or desirous of working in that kind of environment."

Pfeiffer rejected the notion that he lacks Canion's consensus management skills.

Compaq confirmed that Canion was offered a seat on the board, but he refused it. Canion was traveling and was not avail-

able for comment.

Wall Street analysts said they were stunned. Canion had spoken with some 100 of them Wednesday during a conference call about the firm's earnings hit and had said he would see them in November at an analyst's conference.

Little evidence

"There was no inkling that he had a problem," said Joseph McGlone, an analyst at investment research firm McGlone & Associates in Bridgeport, Conn.

McGlone approved of the move. "I personally think it's bullish. I don't understand why people would be upset that Mr. Canion has left. It's the old question of what have you done for me lately? His performance in the last year has been miserable: He's allowed the clones to take market share, held on to the 386 too long and stuck by the retail channel too long."

The change was approved unanimously by Compaq's seven-member board at a regular meeting Oct. 24, with Canion abstaining.

IBM attacks clone makers

FROM PAGE 1

new 386 SLC, a customized version of Intel Corp.'s 80386SX chip, recent price cuts and the more aggressively priced Personal System/2 Models 90 and 95, according to Paul Mugge, vice president of systems at IBM's Entry Systems Division, and William Osborne, director of high-volume systems.

IBM has also improved time to market for new products, Mugge said, citing a 10-month cycle for machines based on the 386 SLC (although general availability is limited to upgrade cards), six-month product enhancement cycles and an expected 15-month delivery time for new multimedia systems based on it, following a 14-month product development cycle for IBM's PS/2 L40 laptop.

"It's incredible how the rate and pace of our development process has picked up," Mugge said, noting IBM has introduced, among other things, three new

processor families of the Model 90 and 95s since their introduction a year ago.

He also pointed to IBM's demonstration of dual-speed processors at the show and a general shift down from 36-month development cycles to 14-month cycles next year.

"We had to change our strategy, process and method if we were going to be able to compete in an industry that is fast becoming commoditized, Mugge said.

Happy campers

Some users were pleased with IBM's newfound aggression. "They're doing what they have to do to do business with us," said Claude Rankin, director of information services at Deloitte & Touche in New York. About half of Deloitte & Touche's 2,000 PCs are from IBM, but the firm has shied away from buying IBM in the last two years.

"I think they're getting back in the market in a big way — they had priced themselves above the level of comfort that major corporate buyers had in continuing to do business with them, and I think they'll get a good response," Rankin said.

Others were unmoved. "Our user confidence in [IBM] is way down," said James P. Connolly, head of technical support at Hughes Aircraft's Radar Systems Group.

Most analysts were cautious, noting that the company has a tough climb ahead of it and will have to continue to respond to what will certainly be continued ferocious pressure from clone makers. Analysts said the company can probably arrest its account erosion, which has seen its share slip from as high as 36% of the market to a level below 30% and as low as 25% this year.

While IBM cited Audits & Surveys data showing it holding steady at this point, the company conceded it must outgrow the rest of the market in the fourth quarter to hold share for the year.

"The market is brutal; pricing is vicious. Being in the PC business is going to be less profitable for all the players, but clearly the companies with the most to lose are AST and Dell if IBM and Compaq get serious about pricing and distribution," said David R. Korus, PC analyst at Kidder, Peabody & Co.

COMDEX SHORTS

Stick to software, Bill

What more appropriate gimmick for the largest U.S. computer trade show than the largest computer? Microsoft Corp.'s Bill Mo, as it was called, sat squarely in front of the Las Vegas Convention Center, stood two stories high and 29 feet wide and was accompanied by a larger-than-life mouse. It also ran Windows applications all day.

It doesn't have to be walked

Sheldon G. Adelson, chairman of The Interface Group and founder of Comdex, drew quizzical looks during his opening remarks when he told the audience at The Las Vegas Hilton's showroom that someday, we might see the computer replace the dog as man's best friend.

Keynote I: Acts of God are our friends

Intel Corp. Chairman Andrew S. Grove's keynote address mixed gently self-deprecating humor with gee-whiz demonstrations of emerging technologies such as multimedia, pen-based computing and wireless modems. Grove got big laughs for a scenario in which Intel is preparing for a big meeting to sell its "686" chip to Apple and for his comment that the main problem with networks is they work best after an act of God.

Keynote II: Acts of God can be bad for you

Paul Mugge, vice president of systems at IBM's Entry Systems Division, probably wished technology was not quite so well developed after a cameraman flashed a close-up on large screens for the audience to see as he broke a plastic snap on an IBM add-in card. Some people overheard Michael Dell, chairman of Dell Computer Corp., crack, "So much for the easy installability of a Micro Channel board." An unflappable Mugge did get the machine to work, despite the broken piece.

Coming attractions

IBM did not announce new products at Comdex/Fall '91, but it flexed its technological muscles, demonstrating a variety of products that it expects to bring to market in the next year. Among them are the following:

- A Personal System/2 Model 90 running one of Intel Corp.'s unannounced P24 chips, which feature an internal clock speed that is twice as fast as the external clock speed.
- The PS/2 56SX, a Micro Channel Architecture version of the PS/2 Model 35, a low-end, Intel 80386SX-based machine with three add-in slots and two drive bays.
- A 20-MHz 386SX, 10.4-pound laptop with a 9-in. active-matrix thin-film transistor color screen with 2M bytes of random-access memory, expandable to 16M bytes, installable with flash-memory integrated circuit cards. The full-size keyboard also features a trackball mouse and dedicated mouse buttons.
- Active-matrix thin-film transistor color screens that were greatly improved over what it had last year, including one 12-in. flat panel running at an Extended Graphics Array (XGA) resolution of 1,024 by 768 dots per pixel inch. However, an executive cautioned that production yields on these products — produced by IBM/Toshiba Corp. joint venture Display Technology, Inc. — were still low. One flat-panel screen demonstrated off the show floor featured an articulated arm for a base.
- New pencentric technology, including pen extensions for OS/2 2.0. IBM also showed a "Workpad" tablet with a color screen. It weighed only four pounds, or two pounds less than the prototype tablet systems it demonstrated on the show floor, but it was AC-powered.
- XGA for the AT bus. It probably will not ship in volume until the second quarter of 1992.

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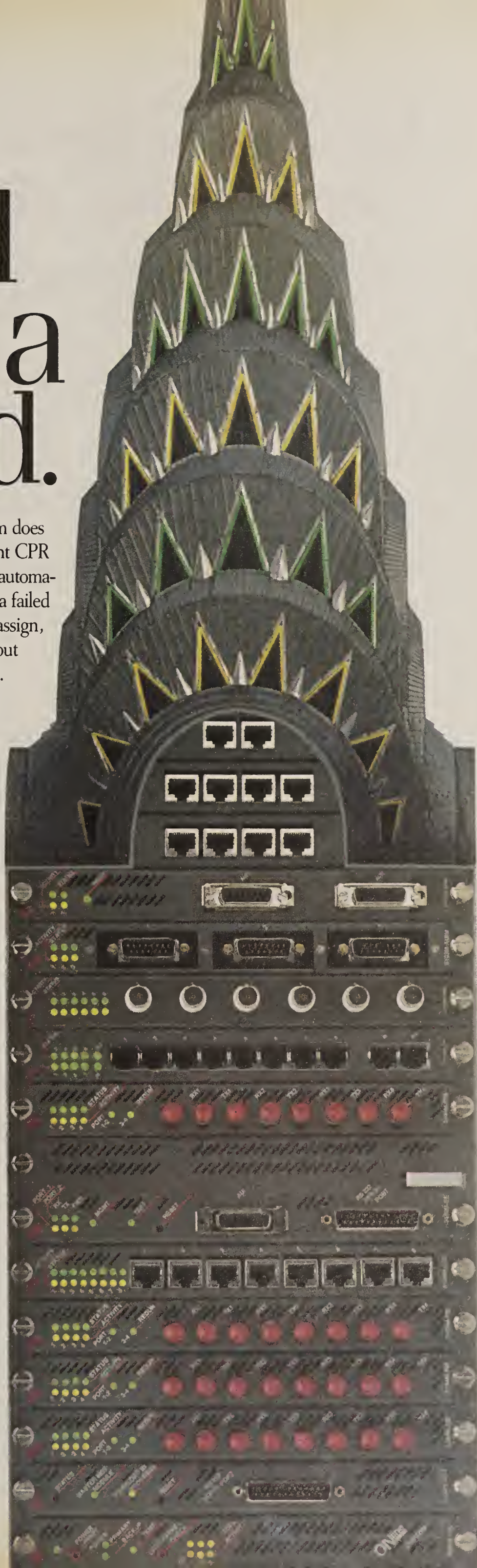
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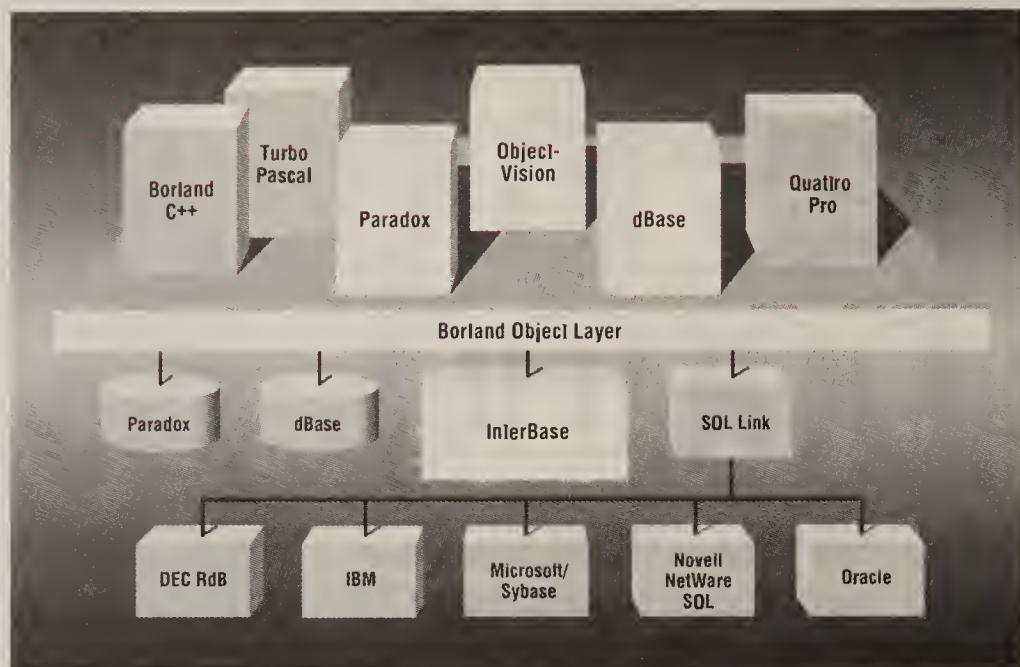
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*1991 J.D. Power and Associates' Computer End User Satisfaction Study: Phase I. Office-Based Small to Medium-sized Businesses. SM Response from Business End Users at 1,784 business sites. Small to medium-sized businesses were based on office sites with between 1 and 499 employees. 1991 J.D. Power and Associates' Computer End User Satisfaction Study: Phase III. Office-Based Large Businesses. SM Responses from Business End Users at 1,094 business sites. Large businesses were based on office sites with 500 or more employees. J.D. Power and Associates is a service mark of J.D. Power and Associates. †Dealer prices may vary. Upgrade pricing good in U.S. and Canada only. Borland is a registered trademark of Borland International, Inc. Copyright © 1991 Borland International, Inc. All rights reserved. BI 1433-2C